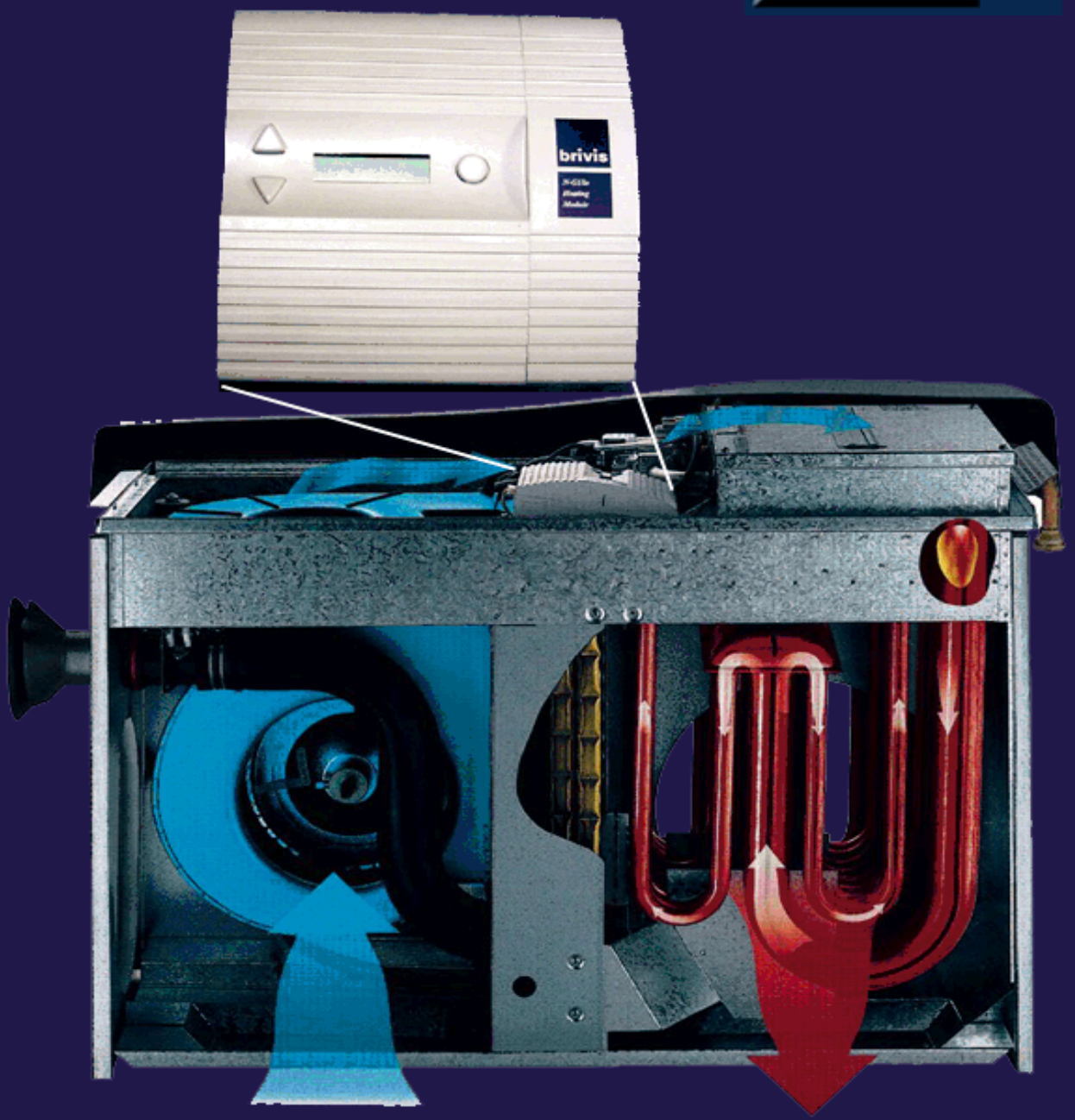
Brivis Service Manual

MPS & Auto EMS
Vol 2 of 2



Servicing shall be carried out only by Authorized Personnel.
This Service Manual must NOT be left with the Owner.

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Bulletins & Servicing Instructions

MPS - Fit AFRO and New Style Burner

No	*DESCRIPTION*	*MODELS AFFECTED*	*PART No REQUIRED*
1	Fit AFRO and new style burner	All MPS models	15100

Background: Some early product was released without a flame roll-out bar fitted to the MPS burner. It was later determined that this feature is an excellent enhancement for product reliability.

Action: Any units found in the field without a flame roll-out bar should have one fitted. If the burner does not have holes and grommets ready for fitting the flame roll-out bar, then the whole burner assembly should be changed to the current production standard. If the burner has holes but not flame roll-out bar, fit the bar and wires using P/No 15100.

Modifications were made to the design of the burner to improve ignition reliability. If problems are being experienced with ignition, and the burner is the old style with the large, round main ports, change the whole burner assembly over to the new burner style, which has slots in the main burner port.

MPS - Amplified Gas Valve Adjustment Sealing

Background: The MPS Amplified gas valve does not require adjustment on installation. Installers have been used to adjusting the regulator on Classic Heaters and erroneously believe they need to adjust a regulator on the MPS product. Adjustment of any of the screws can cause ignition problems.

Action: If adjustment of an amplified valve is necessary, contact T.S.G. for advice. Following any adjustment to an MPS gas valve, seal both the amplification (where present) and offset screws using silicone.
Important: Only 1/4-fill the off-set adjustment cavity prior to replacing the cap.

Bulletins & Servicing Instructions (cont)

MPS HE20e & ME20e - Hot Ducting

No	*DESCRIPTION*	*MODELS AFFECTED*	*PART No REQUIRED*
3	Hot ducting	MPS HE20e MPS ME20e	15099

Background: With certain ducting configurations, ducting temperatures near the heater (on External Models) can be higher than ideal. Fan baffles have been designed that greatly improve mixing of the air within the heater. These baffles direct air over the heat exchanger away from the outlet and therefore allow better mixing prior to the air coming out of the heater.

The baffle cannot be installed in production as its orientation is dependant on whether the heater is reversed when installed.

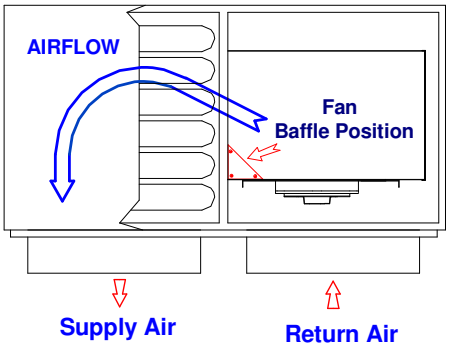
Action: On HE/ME30 external models, the fan baffle (P/No 15099) should be fitted on all units manufactured up to 10/5/97. On 10/5/97, vertical baffles were fitted to the heat exchanger shroud which improved mixing.

On HE/ME20 external models, the fan baffle should be fitted to all units serviced with manufacturing dates up to 12/8/97. On 12/8/97, the heat exchanger shroud was modified and vertical baffles added that greatly improved mixing.

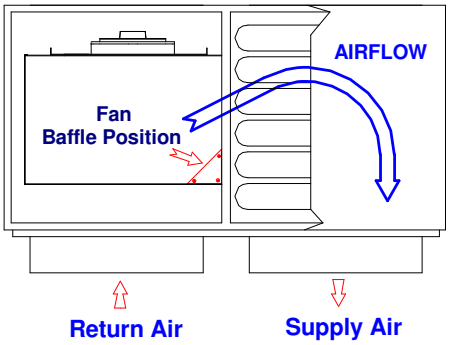
Bulletins & Servicing Instructions (cont)

MPS HE20e & ME20e - Hot Ducting (cont)

NORMAL CONFIGURATION



REVERSED CONFIGURATION



Following fitment of the baffle, write **"Baffle Fitted"** onto the parameter label.

NOTE: Temperature rise of outlets should be checked following fitment of the baffle and then the thermistor set-point set should be changed, as required. Fan speed may also need to be adjusted up to compensate for the slight loss in air flow due to the baffle.

Bulletins & Servicing Instructions (cont)

MPS HE30e & ME30e - Overheat Problem - Reversed Configuration

No	DESCRIPTION	MODELS AFFECTED	PART No REQUIRED
3	Hot ducting	MPS HE30e MPS ME30e	15099

Background: When External 30 models are reversed, some heaters exhibit problems with an "overheat supply air", even though the thermistor's temperature is normal (approx. 60-65 ^{o}C).

Action: Fit fan baffle, as described in Item 3.0 - Hot Ducting above, regardless of dates mentioned.

NOTE: Heater should be checked to ensure that overheat now functions correctly by firstly setting Service Parameter 4 to "15" to prevent heater from modulating down, and secondly, closing outlets and watching the thermistor temperature rise. If the overheat opens before the thermistor reaches 75^{o}C then adjustment of the overheat bracket may be necessary (call T.S.G.).

Important: Remember to return Service Parameter 4 to "2" and check other parameters are correct.

Bulletins & Servicing Instructions (cont)

MPS & Auto EMS Parameter Checks - N-G1/lo

Background: Some parameter changes were made early in production to improve ignition reliability and help the heater perform better under low gas pressure situations.

Action: The following parameters should be checked on all N-G1/lo with Software Version 5.0 or below:

SERVICE PARAMETER	NATURAL GAS VALUE	LPG GAS VALUE
1	70	100
2	110	140
3	70	100
4	2	2
5	15	15
6	5	5

NOTE: Changes to Service Parameters are only stored on a permanent basis if, following adjustment of the value changing, the up or down arrow is pushed to move to another Parameter and then the round button is held until the control returns to the normal display. If this procedure is not followed, the value changed will be lost when power is removed from the N-G1/lo.

Bulletins & Servicing Instructions (cont)

Auto EMS Flame Sensing - Error 46, 50, 70, 71

Background: Errors 46 and 50 indicate that the main flame sensor is not seeing stable flame on ignition. Errors 70 and 71 can indicate that either flame is not on the back-up sensor or that a failure/fault has occurred in the N-G1/lo. Flame sensor problems and other causes of these errors are well described in the N-G1/lo Error Codes section of this Service Manual.

The most common causes of these errors are either low gas pressure from the main supply or incorrect gas valve setting. (For valve adjustment problems, contact T.S.G.).

On Auto-EMS Models, the cross-lighter can heat up and lift and contact the back-up flame sensor causing an Error 70/71.

Action: For MPS Models - when the unit is running on Drive Level 15, ensure that inlet pressure to the valve is no lower than 1 kPa. If the pressure is lower than 1 kPa, then the gas utility needs to be contacted and/or pipework needs upgrading.

For Auto-EMS Models - Check that the backup flame sensor is the new type (probe pointing left with new style bracket) and that it is mounted behind the R.H.S. manifold tab (Ceramic body should end up sitting beside the zip burner not above it). NOTE: Sometimes the rod may not be located correctly in the flame. Bend the probe if necessary to ensure that it is in the flame.

Units with an Error 70/71 that can be reset without turning the power off have a NG1/lo fault (unless power has been cycled, as indicated in the Error Log).

Bulletins & Servicing Instructions (cont)

MPS & Auto EMS - Noisy Motor (on Start up) / Intermittent Error 30

Background: Some motors have been noisy on start-up or slow to start, which can be indicated by a Error 30 (and beeping) intermittently on the Networker. Enhancements have been made to the N-G1/lo enable better motor start and to suppress intermittent Error 30s.

Some motors exhibit noise throughout its operation range.

Action: New software for the N-G1/lo has been produced that creates quieter starting and eliminates this intermittent error. Version 5 software and Version 6 onwards will contain these changes. Fit a new control with these later version numbers in installations exhibiting the above mentioned error.

For installations with noisy motors (other than at start-up), the motor should be replaced.

MPS & Auto EMS - Roll-out Test Error (Error 31)

Background: The flame roll-out sensing system is checked prior to ignition to ensure that the flame rod is not earthed or that a wire has not come loose. Some N-G1/lo units erroneously exhibit a roll-out test error when there is nothing wrong with the external flame roll-out circuit.

Action: If an Error 31 is observed, check that the AFRO has grey silicone AFRO grommets (not black) and that the wiring and location of the flame rod is correct and if so, then replace the N-G1/lo.

Bulletins & Servicing Instructions (cont)

Auto EMS 20e & 26e - Poor Heating

Background: External Auto-EMS models have the thermistor located close to the base box entry. This bracket could be inadvertently bent or poorly located, resulting in the heater thinking that the duct temperature is higher than it actually is.

Action: If the outlet temperature in the house is greatly different to the thermistor temperature, then bend the overheat/thermistor bracket down 30-45º into the base box. This will result in more accurate temperature measurement at the thermistor.

MPS 20 HE & ME noisy motor/ intermittent motor error codes

No	*DESCRIPTION*	*MODELS AFFECTED*	*PART No REQUIRED*
1	Fan motor 500 W 8554PVA - A14 is replaced with 315 W 80855BNVA-A20 with new mounting brackets and 15 uF capacitor.	MPS HE 20e MPS HE 20i MPS ME 20e MPS ME 20i	15289

Background: Early model MPS 20 heaters are prone to noisy motor operation and intermittent motor related error codes and lockouts with original motor.

i.e. Error 30 FAN_LIMP, Error 60 MOTOR_O-C & Error 65 MTR_LKOUT.

Action: All Service Technicians are required to carry out the following procedures when servicing MPS 20 models:

If the fan motor requires replacing, use P/No 15289 - MOTOR 315 W 229MM PLT ASSY which consists of P/No 16049 - 315W 80855BNVA-A20 motor with P/No 15378 - BRKT MOTOR KIT 132/34 and P/No 595 - CAPACITOR 15 uF.

Bulletins & Servicing Instructions (cont)

MPS HE Over Temperature Switch sensing failure

No	DESCRIPTION	MODELS AFFECTED	PART No REQUIRED
1	MPS - Over Temperature Switch sensing failure	MPS HE20e MPS HE 20i MPS HE 30e MPS HE 30i	16189

Background: MPS HE models may be subjected to damage on the plastic condensate tray of the secondary heat exchanger, and /or the plastic fan wheel, if an over temperature due to a fan malfunction occurs.

Duct system over temperature conditions, when the main fan is operating normally, would not cause damage as the over temperature switches will protect the unit as designed.

Action: All Service Technicians are required to carry out the following procedures when servicing MPS HE models with conditions diagnosed as over temperatures not associated with the duct system OR when the combustion fan assembly requires removal.

All Models - Natural Gas & LPG

The FLUE SPIGOT ASSY MPS HE EXT, P/No 16189, must be fitted in replacement of the flue outlet pipe, and wired in series with the Return Air Over Temperature Switch, as described below.

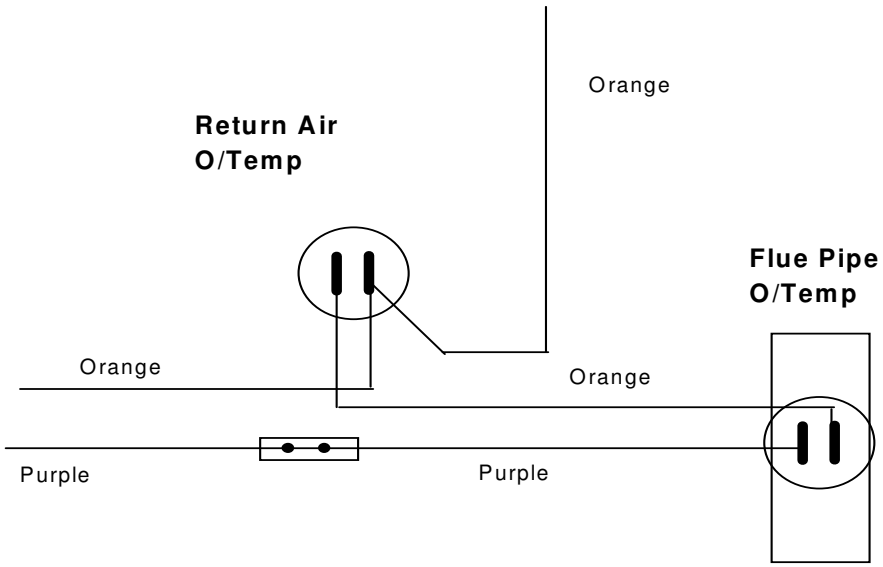
- Remove the combustion fan and main fan assembly.
- Release the flue hose retaining clamp from the flue outlet plate bracket.
- Disconnect the flue pipe and remove the stainless steel pipe and "O" ring fitting.
- Replace the stainless steel pipe with the new FLUE SPIGOT ASSY MPS HE EXT, Part # 16189, and reconnect to the flue outlet plate bracket.
  The rubber flue pipe will require trimming to allow for the new over temperature switch on some models.
  Ensure the flue plate bracket is taunt when the retaining clamp is tightened, so that the new pipe assemble will not shift, allowing the "O" ring fitting to retract from the flue plate and subsequently leaking.

(Continued over page)

Bulletins & Servicing Instructions (cont)

All Models - Natural Gas & LPG (cont)

- Remove the Purple (single) wire terminal from the Return Air Over Temperature Switch, remove the terminal insulator, then connect it to the Purple (male - insulated) terminal of the Over Temperature Switch Pipe Assembly loom.
- Place the new loom's Orange terminal on the now vacant Return Air Over Temperature Switch terminal.
- Connect the loom's Right angle insulated terminals to the Flue Pipe Over Temperature Switch.
- Route the loom, so as not to be damaged by the fan operation or removal, and secure with cable ties.



Bulletins & Servicing Instructions (cont)

Auto EMS - Error 71 - FSafe_LOC Lockout

No	DESCRIPTION	MODELS AFFECTED	PART No. REQUIRED
1	Error 71 FSafe_LOC without establishing ignition	Auto EMS	14100
2	Auto EMS VR8601 gas valve with potential intermittent fault (revised)	Auto EMS	16054 NG or 16055 LPG

Auto EMS models locking out with an Error 71 (FSafe_LOC) whilst attempting to establish ignition.

Background: Auto EMS heaters are prone to an intermittent Error 71 lockout condition, in the course of establishing pilot ignition and confirmation. This is due to the tolerance range on the components that determine the timing for a lockout when no flame is detected on the back up flame sensor.

Action: All Service Technicians are required to carry out the following procedures when servicing Auto EMS models:

- Turn OFF the gas supply to the unit and turn ON the heater and commence an ignition sequence.
- Check the heater will proceed to an IGN_RETRY (Error 46) after the pilot ignition time 60 sec has expired.
- If the N-G1/lo module locks out with an Error 71, and doesn't proceed to a ignition retry, then replace the N-G1/lo and repeat the test.

Note:
The Networker will display a "reset" button with this or a normal Error 71 condition but cannot be reset.
If the reset button is pressed and the unit does reset, then the unit doesn't require service, as the resettable Error 71 may never re appear. Check with the owner if the Networker resets the heater.

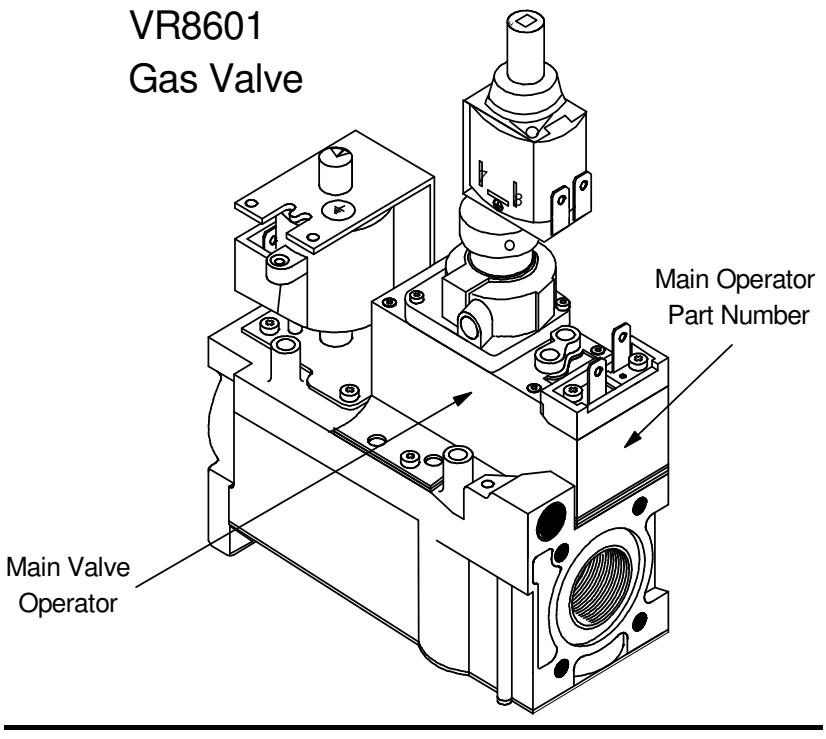
Bulletins & Servicing Instructions (cont)

Auto EMS - Gas Valve VR8601 Main Operator

Background: The Auto EMS VR8601 gas valve main operator (part stamped V804A), have been identified as having a potential intermittent fault.
The main operator may intermittently have an open circuit to the solenoid causing the valve to close.
This condition is more likely to occur as the valve (operator solenoid coil) gains temperature during use, and may also create an unexplainable Error 71 (FSaFE_LOC).

Action (revised from Issue 2): All Service Technicians, when servicing Auto EMS models in relation to an FSaFE_LOC (Error 71) condition, are required to:

- Carry out all servicing checks as per service manuals, bulletins and servicing instructions.
- Replace the gas valve, if **no other cause can be identified.**



Bulletins & Servicing Instructions (cont)

Auto EMS N-G1/lo Safety Rework

All Auto EMS units that were manufactured, or had the N-G1/lo module replaced, in the period between June and September 1998, require the N-G1/lo module to be checked and upgraded as described below.

No	*DESCRIPTION*	*MODELS AFFECTED*	*PART No. REQUIRED*
1	Auto EMS N-G1/lo module safety rework	Auto EMS 20e Auto EMS 20i Auto EMS 26e Auto EMS 26i	14100

Background:
During safety development testing in our R & D department, it was observed that the N-G1/lo module may not respond in the rare case of multiple malfunctions on Auto EMS units.
An earlier N-G1/lo module modification to overcome current field problems, inadvertently introduced the error to versions VC9, V10, V11, V12, V13, & V14 controls.
The likelihood of Auto EMS units experiencing these conditions in the field is very low, however, all units must be checked and/or reworked.

Action:
All Auto EMS heaters must have the N-G1/lo module version checked, and if the version is **VC9, V10, V11, V12, V13, & V14**, the N-G1/lo module must be replaced.
In all cases the service call sheet must correctly document the unit serial number, and new Site and Fault codes for the type of work performed as follows:

- **Site fault = 49 Safety Check / Upgrade** (Must be used for both Check and Upgrade).

- **Part fault = 155 - 503 Upgrade C9 to 14** (Part Replaced and marked as **PR in "Type column"**).

- Any other work performed Warranty/PR/Chargeable etc. to be filled in on sheet as normal in addition to the above.

Bulletins & Servicing Instructions (cont)

N-G1/lo Errors Due to "Add On Cooling" Operation

MPS and Auto EMS units fitted with "add on cooling" may be affected by a power influx when the cooling is switched OFF.
This is more likely to occur with larger (higher current draw) cooling equipment and may be intermittent.

The REFRIG cooling operation is not interrupted or affected by this condition, and the fault is not detected until the user attempts to operate the heater.

The N-G1/lo module with this fault will display one or more of the following error codes:

- Error 44 - RoLLOuT
- Error 52 - FLM_NOGAS
- Error 61 - !
- Error 63 - !
- Error 64 - ! Any 503 FAIL
- Error 67 - !

Check N-G1/lo event log carefully.

Important:

Try to gain as much information about the timing of when this error occurred, so that you can confidently diagnose if the error/s is related to the use of the cooling equipment and not one of the above.
i.e. does the error occur only after using the cooling ?, when did you last use the heater ?

NOTE: The above conditions could also apply to a MPS or Auto EMS unit operating on a power supply circuit subjected to similar conditions caused by a high current appliance. i.e. ARC welder.

Bulletins & Servicing Instructions (cont)

MPS & Auto EMS Fan Motor Vibration or Noise

MPS and Auto EMS fan motors have had cases where the motor can vibrate during the normal operation or on initial start up.

The following checks should out be carried in this order, when servicing for excessive motor noise and/or motor vibration:

- Check the fan wheel bush lock screw is tightened securely and re test
- Check if the fan housing and the combustion fan plate are not vibrating together (separate or insulate with foam to eliminate possible vibration source).
- Check that the fan motor casing is not touching the mounting brackets.
- Check and test for FAN_LIMP (Error 30) mode operation and re test
- Check the N-G1/lo to N-G1/hi Interconnection loom and perform Earth test (as per page 112)
- Perform Fan Speed Sensor Test (as per page 112)
- Check and test for TACHO_Err (Error 37) mode operation and re test
    - The speed sensor loom is plugged into the N-G1/lo.
    - Check the fan motor operation for irregular RPM and or jerking/pulsing operation.
- Replace N-G1/hi module and re test (N-G1/hi module PCB resistor may be out of specification).

Bulletins & Servicing Instructions (cont)

MPS External N-G1/hi Module

The mounting of the N-G1/hi module on early build MPS external heaters, subjects the module to accidental water entry from the combustion fan tray, through the slot cut-outs.

These cut-out slots have now been eliminated in production, and the N-G1/hi module is fixed using a self tapping screw on the modules end brackets.

Service technicians should remedy by applying silicon sealant over the combustion fan tray cut-out slots for protection. i.e. unit exposed to rain water entry when servicing with unit roof off.

Technical Information ME 35 Internal

AGA Approval No.:	5503	**Energy Label Star Rating:** 4.0 Stars		151 MJ/m^3/Year
Dimensions	**Length**	**Width**	**Height**	**Weight**
Cabinet	1080 mm	545 mm	710 mm	88.0 kg

Gas Type	**Natural Gas**	
Input (max)	150.0 MJ/h	42.0 kW
Output (max)	126.0 MJ/h	35.0 kW
Input (min)	68.0 MJ/h	19.0 kW
Output (min)	54.0 MJ/h	15.0 kW

	Natural Gas (Amplified Valve)	**Natural Gas** (1:1 Valve)**
Burner Pressure		
Maximum	680 Pa	400 Pa
Minimum	150 Pa	180 Pa
Injector Main Burner	6.8 mm	6 SLOTS

Fan Motor	**Standard**	**Combustion Fan**
Model	Fasco	EBM
Model No.	80855BPVA-A12	R2E220-AA52-D4
Watts	650	80
Amps	4.3	0.34
Capacitor	25 uF	2 uF
Fan Impellor Size	270 X 270mm (10" X 10")	220 mm
Combustion Fan Air Signal – High	400 Pa	
Combustion Fan Air Signal – Low	250 - 300 Pa	

Return Air Grille Size	
With Filter	0.47 m^2
No Filter	0.26 m^2

Airflow (l/sec) @ Total Static Pressure	**50 Pa**	**75 Pa**	**100 Pa**	**125 Pa**
Standard	1160	1120	1100	1060

Gas Valves:** N/Gas (5:1 Amplified) – VK105R (1009) Code: -001 Amp Factor 5.
N/Gas (1:1) – SIT 848 SIGMA Code: 0848030.
LPG (25:1 Amplified) – VK8105R (1017) Code: -004 Amp Factor 25.

Speed Sensor: Tek 507.
Primary Heat Exchanger: 2mm Aluminised Steel.
Control Fuse: 2 Amp type 3AG.
Transformer: 2 Amp
Over Temperature Switch:
Supply Air Compartment: (2) Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Supply Air Duct Thermistor: (90^{o}C)

Electronic Heater Controller:

N-G1/lo. Low Voltage, electronic controller

FEATURES:
- Liquid Crystal Display screen to show unit operation status.
- Installer system set-up function buttons.
- 2 Amps fuse (circuit protection).
- 24 Volt AC output terminal.
- Cooling fan (refrigeration/recirculation) switch facility.
- Thermistor input (Supply Air Terminal)

N-G1/hi. High Voltage, Power Output Module

FEATURES:
- Power supply input terminals.
- Main fan power supply output terminals.
- Combustion fan power supply output terminals.
- N-G1/lo power supply output terminal.
- Speed sensor (fan motor) input terminal.

**** New 1:1 Gas Valves, Slot Type Injectors and lower burner pressures were introduced for this model on the 02/04/02. Slot Type Injectors are not suitable for use on units with Amplified Gas Valves. 1:1 and Amplified Gas Valves are not interchangeable; always replace an Amplified with an Amplified and a 1:1 with a 1:1.**

Technical Information ME 35 Internal V3

AGA Approval No.: 5503 **Energy Label Star Rating:** 4.0 Stars 151 MJ/m^3/Year

Dimensions	**Length**	**Width**	**Height**	**Weight**
Cabinet	1105 mm	545 mm	660 mm	75.0 kg

Gas Type	**Natural Gas**	
Input (max)	150.0 MJ/h	42.0 kW
Output (max)	126.0 MJ/h	35.0 kW
Input (min)	71.0 MJ/h	19.5 kW
Output (min)	54.0 MJ/h	15.0 kW

	Natural Gas (1:1 Valve)
Burner Pressure	
Maximum	400 Pa
Minimum	180 Pa
Injector Main Burner	8 x 6mm Holes

Fan Motor	**Standard**	**Combustion Fan**	**Combustion Fan**
Model	Fasco	EBM	EBM
Model No.	80855BPVA-A12	R2E220-AA52-D4	R2E190-AE21-F2
Watts	650	80	75
Amps	4.3	0.34	0.32
Capacitor	25 uF	2 uF	1.5 uF
Fan Impellor Size	270 X 270mm (10" X 10")	220 mm	190 mm

Combustion Fan Air Signal – High	400 Pa
Combustion Fan Air Signal – Low	250 - 300 Pa

Return Air Grille Size	
With Filter	0.48 m^2
No Filter	0.3 m^2

Airflow (l/sec) @ Total Static Pressure	**50 Pa**	**75 Pa**	**100 Pa**	**125 Pa**
Standard	1200	1180	1150	1120

Gas Valves: N/Gas (1:1) – SIT 848 SIGMA Code: 0848030.
Speed Sensor: Tek 507.
Primary Heat Exchanger: 2mm Aluminised Steel.
Control Fuse: 2 Amp type 3AG.
Transformer: 2 Amp
Over Temperature Switch: Supply Air Compartment: (2) Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Supply Air Duct Thermistor: (90^{o}C)

Electronic Heater Controller:

N-G1/lo. Low Voltage, electronic controller

FEATURES: Liquid Crystal Display screen to show unit operation status.
Installer system set-up function buttons.
2 Amps fuse (circuit protection).
24 Volt AC output terminal.
Thermistor input (Supply Air Terminal).

N-G1/hi. High Voltage, Power Output Module

FEATURES: Power supply input terminals.
Main fan power supply output terminals.
Combustion fan power supply output terminals.
N-G1/lo power supply output terminal.
Speed sensor (fan motor) input terminal.

Technical Information HE 30 External

AGA Approval No.:	5503	**Energy Label Star Rating:** 5.1 Stars			132 MJ/m^3/Year
Dimensions	**Length**	**Width**	**Height**		**Weight**
Overall	1030 mm	545 mm	700 mm		89.0 kg
Gas Type	**Natural Gas / LPG**				
Input (max)	120.0 MJ/h	33.0 kW			
Output (max)	108.0 MJ/h	30.0 kW			
Input (min)	45.0 MJ/h	13.0 kW			
Output (min)	32.0 MJ/h	9.0 kW			

	Natural Gas (Amplified Valve)	**LPG (Amplified Valve)**	**Natural Gas** (1:1 Valve)**
Burner Pressure			
Maximum	720 Pa	2320 Pa	400 Pa
Minimum	150 Pa	800 Pa	180 Pa
Injector Main Burner	6.2 mm	3.3 mm	4 SLOTS

Fan Motor	**Standard / XA**	**Combustion Fan**
Model	Fasco	EBM
Model No.	80855BPVA-A12	R2E220-AA52-D4
Watts	650	80
Amps	4.3	0.34
Capacitor	25 uF	2 uF
Fan Impellor Size	270 X 270mm (10" X 10")	220 mm
Combustion Fan Air Signal – High	400 Pa	
Combustion Fan Air Signal – Low		250 - 300 Pa

Return Air Grille Size	**Standard**	**XA**
With Filter	0.39 m^2	0.43 m^2
No Filter	0.22 m^2	0.24 m^2

Airflow (l/sec) @ Total Static Pressure	**50 Pa**	**75 Pa**	**100 Pa**	**125 Pa**
Standard	870	850	830	800
Extra Air (XA)	980	950	920	880

Gas Valves: ** N/Gas (5:1 Amplified) – VK105R (1009) Code: -001 Amp Factor 5.
N/Gas (1:1) – SIT 848 SIGMA Code: 0848030.
LPG (25:1 Amplified) – VK8105R (1017) Code: -004 Amp Factor 25.

Speed Sensor: Tek 507.
Primary Heat Exchanger: 2mm Aluminised Steel.
Secondary Heat Exchanger: 0.89mm, (316) Stainless Steel.
Control Fuse: 2 Amp type 3AG.
Transformer: 2 Amp
Over Temperature Switch:
Supply Air Compartment: (2) Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Flue Outlet Pipe: Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Supply Air Duct Thermistor: (90^{o}C) (10 kOHM @ 20^{o}C)

Electronic Heater Controller:
N-G1/lo. Low Voltage, electronic controller
FEATURES:
- Liquid Crystal Display screen to show unit operation status.
- Installer system set-up function buttons.
- 2 Amps fuse (circuit protection).
- 24 Volt AC output terminal.
- Thermistor input (Supply Air Terminal).

N-G1/hi. High Voltage, Power Output Module
FEATURES:
- Power supply input terminals.
- Main fan power supply output terminals.
- Combustion fan power supply output terminals.
- N-G1/lo power supply output terminal.
- Speed sensor (fan motor) input terminal.

**** New 1:1 Gas Valves, Slot Type Injectors & lower burner pressures were introduced for Natural Gas versions of this model on the 19/03/02. Slot Type Injectors are not suitable for use on units with Amplified Gas Valves. 1:1 and Amplified Gas Valves are not interchangeable, always replace an Amplified with an Amplified and a 1:1 with a 1:1.**

Technical Information HE 30 External V3

AGA Approval No.: 5503 **Energy Label Star Rating:** 5.5 Stars 126 MJ/m^3/Year

Dimensions	**Length**	**Width**	**Height**	**Weight**
Overall	1125 mm	570 mm	780 mm	90.0 kg

Gas Type	**Natural Gas / LPG**	
Input (max)	120.0 MJ/h	33.0 kW
Output (max)	108.0 MJ/h	30.0 kW
Input (min)	60.0 MJ/h	16.5 kW
Output (min)	32.0 MJ/h	9.0 kW

	LPG (Amplified Valve)	**Natural Gas (1:1 Valve)**
Burner Pressure		
Maximum	2320 Pa	400 Pa
Minimum	800 Pa	180 Pa
Injector Main Burner	3.4 mm	8 x 5mm Holes

Fan Motor	**Standard**	**Combustion Fan**	**Combustion Fan**
Model	Fasco	EBM	EBM
Model No.	80855BPVA-A12	R2E220-AA52-D4	R2E190-AE21-F2
Watts	650	80	75
Amps	4.3	0.34	0.32
Capacitor	25 uF	2 uF	1.5 uF
Fan Impellor Size	270 X 270mm (10" X 10")	220 mm	190 mm
Combustion Fan Air Signal – High	400 Pa		
Combustion Fan Air Signal – Low		250 - 300 Pa	

Return Air Grille Size	**Standard**	**XA**
With Filter	0.48 m^2	0.48 m^2
No Filter	0.3 m^2	0.3 m^2

Airflow (l/sec) @ Total Static Pressure	**50 Pa**	**75 Pa**	**100 Pa**	**125 Pa**
Standard	1090	1055	1020	990
XA	1120	1085	1060	1035

Gas Valves: ** N/Gas (1:1) – SIT 848 SIGMA Code: 0848030.
LPG (25:1 Amplified) – VK8105R (1017) Code: -004 Amp Factor 25.

Speed Sensor: Tek 507.

Primary Heat Exchanger: 2mm Aluminised Steel.

Secondary Heat Exchanger: 0.89mm, (316) Stainless Steel.

Control Fuse: 2 Amp type 3AG.

Transformer: 2 Amp

Over Temperature Switch:
Supply Air Compartment: (2) Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Flue Outlet Pipe: Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Supply Air Duct Thermistor: (90^{o}C) (10 kOHM @ 20^{o}C)

Electronic Heater Controller:

N-G1/lo. Low Voltage, electronic controller

FEATURES: Liquid Crystal Display screen to show unit operation status.
Installer system set-up function buttons.
2 Amps fuse (circuit protection).
24 Volt AC output terminal.
Thermistor input (Supply Air Terminal).

N-G1/hi. High Voltage, Power Output Module

FEATURES: Power supply input terminals.
Main fan power supply output terminals.
Combustion fan power supply output terminals.
N-G1/lo power supply output terminal.
Speed sensor (fan motor) input terminal.

Technical Information ME 30 External

AGA Approval No.:	5503	**Energy Label Star Rating:**	4.0 Stars	151 MJ/m^3/Year

Dimensions	**Length**	**Width**	**Height**	**Weight**
Overall	1030 mm	545 mm	700 mm	82.0 kg

Gas Type	**Natural Gas / LPG**	
Input (max)	130.0 MJ/h	37.0 kW
Output (max)	108.0 MJ/h	30.0 kW
Input (min)	62.0 MJ/h	17.0 kW
Output (min)	43.0 MJ/h	12.0 kW

	Natural Gas (Amplified Valve)	**LPG (Amplified Valve)**	**Natural Gas** (1:1 Valve)**
Burner Pressure			
Maximum	700 Pa	2300 Pa	400 Pa
Minimum	150 Pa	800 Pa	180 Pa
Injector Main Burner	6.35 mm	3.3 mm	4 SLOTS

Fan Motor	**Standard / XA**	**Combustion Fan**
Model	Fasco	EBM
Model No.	80855BPVA-A12	R2E220-AA52-D4
Watts	650	80
Amps	4.3	0.34
Capacitor	25 uF	2 uF
Fan Impellor Size	270 X 270mm (10" X 10")	220 mm
Combustion Fan Air Signal – High		400 Pa
Combustion Fan Air Signal – Low		250 - 300 Pa

Return Air Grille Size	**Standard**	**XA**
With Filter	0.39 m^2	0.43 m2
No Filter	0.22 m^2	0.24 m2

Airflow (l/sec) @ Total Static Pressure	**50 Pa**	**75 Pa**	**100 Pa**	**125 Pa**
Standard	870	850	830	800
Extra Air (XA)	980	950	920	880

Gas Valves:** N/Gas (5:1 Amplified) – VK105R (1009) Code: -001 Amp Factor 5.
N/Gas (1:1) – SIT 848 SIGMA Code: 0848030.
LPG (25:1 Amplified) – VK8105R (1017) Code: -004 Amp Factor 25.

Speed Sensor: Tek 507.
Primary Heat Exchanger: 2mm Aluminised Steel.
Control Fuse: 2 Amp type 3AG.
Transformer: 2 Amp
Over Temperature Switch:
Supply Air Compartment: (2) Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Supply Air Duct Thermistor: (90^{o}C) (10 kOHM @ 20^{o}C)

Electronic Heater Controller:
N-G1/lo. Low Voltage, electronic controller
FEATURES:
Liquid Crystal Display screen to show unit operation status.
Installer system set-up function buttons.
2 Amps fuse (circuit protection).
24 Volt AC output terminal.
Thermistor input (Supply Air Terminal).

N-G1/hi. High Voltage, Power Output Module
FEATURES:
Power supply input terminals.
Main fan power supply output terminals.
Combustion fan power supply output terminals.
N-G1/lo power supply output terminal.
Speed sensor (fan motor) input terminal.

**** New 1:1 Gas Valves, Slot Type Injectors & lower burner pressures were introduced for Natural Gas versions of this model on the 19/03/02. Slot Type Injectors are not suitable for use on units with Amplified Gas Valves. 1:1 and Amplified Gas Valves are not interchangeable, always replace an Amplified with an Amplified and a 1:1 with a 1:1.**

Technical Information ME 30 External V3

AGA Approval No.: 5503 **Energy Label Star Rating:** 4.0 Stars 151 MJ/m^3/Year

Dimensions	**Length**	**Width**	**Height**	**Weight**
Overall	1125 mm	570 mm	780 mm	88.0 kg

Gas Type	**Natural Gas / LPG**	
Input (max)	130.0 MJ/h	37.0 kW
Output (max)	108.0 MJ/h	30.0 kW
Input (min)	65.0 MJ/h	18.0 kW
Output (min)	43.0 MJ/h	12.0 kW

	LPG (Amplified Valve)	**Natural Gas** (1:1 Valve)**
Burner Pressure		
Maximum	2300 Pa	400 Pa
Minimum	800 Pa	180 Pa
Injector Main Burner	3.4 mm	8 x 5mm Holes

Fan Motor	**Standard**	**Combustion Fan**	**Combustion Fan**
Model	Fasco	EBM	EBM
Model No.	80855BPVA-A12	R2E220-AA52-D4	R2E190-AE21-F2
Watts	650	80	75
Amps	4.3	0.34	0.32
Capacitor	25 uF	2 uF	1.5 uF
Fan Impellor Size	270 X 270mm (10" X 10")	220 mm	190 mm
Combustion Fan Air Signal – High		400 Pa	
Combustion Fan Air Signal – Low		250 - 300 Pa	

Return Air Grille Size	**Standard**	**XA**
With Filter	0.48 m^2	0.48 m^2
No Filter	0.3 m^2	0.3 m^2

Airflow (l/sec) @ Total Static Pressure	**50 Pa**	**75 Pa**	**100 Pa**	**125 Pa**
Standard	1200	1150	1100	1050
XA	1200	1150	1100	1050

Gas Valves:** N/Gas (1:1) – SIT 848 SIGMA Code: 0848030.
LPG (25:1 Amplified) – VK8105R (1017) Code: -004 Amp Factor 25.

Speed Sensor: Tek 507.

Primary Heat Exchanger: 2mm Aluminised Steel.

Control Fuse: 2 Amp type 3AG.

Transformer: 2 Amp

Over Temperature Switch: Supply Air Compartment: (2) Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Supply Air Duct Thermistor: (90^{o}C) (10 kOHM @ 20^{o}C)

Electronic Heater Controller:

N-G1/lo. Low Voltage, electronic controller

FEATURES:
- Liquid Crystal Display screen to show unit operation status.
- Installer system set-up function buttons.
- 2 Amps fuse (circuit protection).
- 24 Volt AC output terminal.
- Thermistor input (Supply Air Terminal).

N-G1/hi. High Voltage, Power Output Module

FEATURES:
- Power supply input terminals.
- Main fan power supply output terminals.
- Combustion fan power supply output terminals.
- N-G1/lo power supply output terminal.
- Speed sensor (fan motor) input terminal.

Technical Information HE 30 Internal

AGA Approval No.: 5503 **Energy Label Star Rating:** 5.1 Stars 132 MJ/m^3/Year

Dimensions	**Length**	**Width**	**Height**	**Weight**
Overall	1080 mm	710 mm	610 mm	96.0 kg

Gas Type	**Natural Gas / LPG**	
Input (max)	120.0 MJ/h	33.0 kW
Output (max)	108.0 MJ/h	30.0 kW
Input (min)	45.0 MJ/h	13.0 kW
Output (min)	32.0 MJ/h	9.0 kW

	Natural Gas (Amplified Valve)	**LPG (Amplified Valve)**	**Natural Gas** (1:1 Valve)**
Burner Pressure			
Maximum	720 Pa	2320 Pa	400 Pa
Minimum	150 Pa	800 Pa	180 Pa
Injector Main Burner	6.2 mm	3.3 mm	4 SLOTS

Fan Motor	**Standard / XA**	**Combustion Fan**
Model	Fasco	EBM
Model No.	80855BPVA-A12	R2E220-AA52-D4
Watts	650	80
Amps	4.3	0.34
Capacitor	25 uF	2 uF
Fan Impellor Size	270 X 270mm (10" X 10")	220 mm

Combustion Fan Air Signal – High	400 Pa	
Combustion Fan Air Signal – Low	250 - 300 Pa	
Return Air Grille Size	**Standard**	**XA**
With Filter	0.39 m^2	0.43 m^2
No Filter	0.22 m^2	0.24 m^2

Airflow (l/sec) @ Total Static Pressure	**50 Pa**	**75 Pa**	**100 Pa**	**125 Pa**
Standard	900	875	845	810
Extra Air (XA)	975	945	915	885

Gas Valves:** N/Gas (5:1 Amplified) – VK105R (1009) Code: -001 Amp Factor 5.
N/Gas (1:1) – SIT 848 SIGMA Code: 0848030.
LPG (25:1 Amplified) – VK8105R (1017) Code: -004 Amp Factor 25.

Speed Sensor: Tek 507.
Primary Heat Exchanger: 2mm Aluminised Steel.
Secondary Heat Exchanger: 0.89mm, (316) Stainless Steel.
Control Fuse: 2 Amp type 3AG.
Transformer: 2 Amp
Over Temperature Switch:
Supply Air Compartment: (2) Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Flue Outlet Pipe: Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Supply Air Duct Thermistor: (90^{o}C) (10 kOHM @ 20^{o}C)

Electronic Heater Controller:
N-G1/lo. Low Voltage, electronic controller
FEATURES:
Liquid Crystal Display screen to show unit operation status.
Installer system set-up function buttons.
2 Amps fuse (circuit protection).
24 Volt AC output terminal.
Thermistor input (Supply Air Terminal).

N-G1/hi. High Voltage, Power Output Module
FEATURES:
Power supply input terminals.
Main fan power supply output terminals.
Combustion fan power supply output terminals.
N-G1/lo power supply output terminal.
Speed sensor (fan motor) input terminal.

*** New 1:1 Gas Valves, Slot Type Injectors & lower burner pressures were introduced for Natural Gas versions of this model on the 19/03/02. Slot Type Injectors are not suitable for use on units with Amplified Gas Valves. 1:1 and Amplified Gas Valves are not interchangeable, always replace an Amplified with an Amplified and a 1:1 with a 1:1.**

Technical Information HE 30 Internal V3

AGA Approval No.: 5503 **Energy Label Star Rating:** 5.5 Stars 126 MJ/m^3/Year

Dimensions	**Length**	**Width**	**Height**	**Weight**
Overall	1105 mm	545 mm	660 mm	78.0 kg

Gas Type	**Natural Gas / LPG**	
Input (max)	120.0 MJ/h	33.0 kW
Output (max)	108.0 MJ/h	30.0 kW
Input (min)	60.0 MJ/h	16.5 kW
Output (min)	32.0 MJ/h	9.0 kW

	LPG (Amplified Valve)	**Natural Gas (1:1 Valve)**
Burner Pressure		
Maximum	2320 Pa	400 Pa
Minimum	800 Pa	180 Pa
Injector Main Burner	3.4 mm	8 x 5mm Holes

Fan Motor	**Standard**	**Combustion Fan**	**Combustion Fan**
Model	Fasco	EBM	EBM
Model No.	80855BPVA-A12	R2E220-AA52-D4	R2E190-AE21-F2
Watts	650	80	75
Amps	4.3	0.34	0.32
Capacitor	25 uF	2 uF	1.5 uF
Fan Impellor Size	270 X 270mm (10" X 10")	220 mm	190 mm

Combustion Fan Air Signal – High	400 Pa
Combustion Fan Air Signal – Low	250 - 300 Pa

Return Air Grille Size	**Standard**	**XA**
With Filter	0.48 m^2	0.48 m^2
No Filter	0.3 m^2	0.3 m^2

Airflow (l/sec) @ Total Static Pressure	**50 Pa**	**75 Pa**	**100 Pa**	**125 Pa**
Standard	1100	1065	1035	1010
XA	1160	1125	1100	1065

Gas Valves:** N/Gas (1:1) – SIT 848 SIGMA Code: 0848030.
LPG (25:1 Amplified) – VK8105R (1017) Code: -004 Amp Factor 25.

Speed Sensor: Tek 507.

Primary Heat Exchanger: 2mm Aluminised Steel.

Secondary Heat Exchanger: 0.89mm, (316) Stainless Steel.

Control Fuse: 2 Amp type 3AG.

Transformer: 2 Amp

Over Temperature Switch:
Supply Air Compartment: (2) Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Flue Outlet Pipe: Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Supply Air Duct Thermistor: (90^{o}C) (10 kOHM @ 20^{o}C)

Electronic Heater Controller:

N-G1/lo. Low Voltage, electronic controller

FEATURES: Liquid Crystal Display screen to show unit operation status.
Installer system set-up function buttons.
2 Amps fuse (circuit protection).
24 Volt AC output terminal.
Thermistor input (Supply Air Terminal).

N-G1/hi. High Voltage, Power Output Module

FEATURES: Power supply input terminals.
Main fan power supply output terminals.
Combustion fan power supply output terminals.
N-G1/lo power supply output terminal.
Speed sensor (fan motor) input terminal.

Technical Information ME 30 Internal

AGA Approval No.: 5503 **Energy Label Star Rating:** 4.0 Stars 151 MJ/m^3/Year

Dimensions	**Length**	**Width**	**Height**	**Weight**
Overall	1080 mm	710 mm	610 mm	88.0 kg

Gas Type	**Natural Gas / LPG**	
Input (max)	130.0 MJ/h	37.0 kW
Output (max)	108.0 MJ/h	30.0 kW
Input (min)	62.0 MJ/h	17.0 kW
Output (min)	43.0 MJ/h	12.0 kW

	Natural Gas (Amplified Valve)	**LPG (Amplified Valve)**	**Natural Gas** (1:1 Valve)**
Burner Pressure			
Maximum	700 Pa	2300 Pa	400 Pa
Minimum	150 Pa	800 Pa	180 Pa
Injector Main Burner	6.35 mm	3.3 mm	4 SLOTS

Fan Motor	**Standard / XA**	**Combustion Fan**
Model	Fasco	EBM
Model No.	80855BPVA-A12	R2E220-AA52-D4
Watts	650	80
Amps	4.3	0.34
Capacitor	25 uF	2 uF
Fan Impellor Size	270 X 270mm (10" X 10")	220mm

Combustion Fan Air Signal – High	400 Pa	
Combustion Fan Air Signal – Low		250 - 300 Pa
Return Air Grille Size	**Standard**	**XA**
With Filter	0.39 m^2	0.43 m^2
No Filter	0.22 m^2	0.24 m^2

Airflow (l/sec) @ Total Static Pressure	**50 Pa**	**75 Pa**	**100 Pa**	**125 Pa**
Standard	900	875	845	810
Extra Air (XA)	975	945	915	885

Gas Valves:** N/Gas (5:1 Amplified) – VK105R (1009) Code: -001 Amp Factor 5.
N/Gas (1:1) – SIT 848 SIGMA Code: 0848030.
LPG (25:1 Amplified) – VK8105R (1017) Code: -004 Amp Factor 25.

Speed Sensor: Tek 507.
Primary Heat Exchanger: 2mm Aluminised Steel.
Control Fuse: 2 Amp type 3AG.
Transformer: 2 Amp
Over Temperature Switch:

Supply Air Compartment: (2) Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Supply Air Duct Thermistor: (90^{o}C) (10 kOHM @ 20^{o}C)

Electronic Heater Controller:

N-G1/lo. Low Voltage, electronic controller

FEATURES:
- Liquid Crystal Display screen to show unit operation status.
- Installer system set-up function buttons.
- 2 Amps fuse (circuit protection).
- 24 Volt AC output terminal.
- Thermistor input (Supply Air Terminal).

N-G1/hi. High Voltage, Power Output Module

FEATURES:
- Power supply input terminals.
- Main fan power supply output terminals.
- Combustion fan power supply output terminals.
- N-G1/lo power supply output terminal.
- Speed sensor (fan motor) input terminal.

**** New 1:1 Gas Valves, Slot Type Injectors & lower burner pressures were introduced for Natural Gas versions of this model on the 19/03/02. Slot Type Injectors are not suitable for use on units with Amplified Gas Valves. 1:1 and Amplified Gas Valves are not interchangeable, always replace an Amplified with an Amplified and a 1:1 with a 1:1.**

Technical Information ME 30 Internal V3

AGA Approval No.: 5503 **Energy Label Star Rating:** 4.0 Stars 151 MJ/m^3/Year

Dimensions	**Length**	**Width**	**Height**	**Weight**
Overall	1105 mm	545 mm	660 mm	75.0 kg

Gas Type	**Natural Gas / LPG**	
Input (max)	130.0 MJ/h	37.0 kW
Output (max)	108.0 MJ/h	30.0 kW
Input (min)	61.0 MJ/h	17.0 kW
Output (min)	43.0 MJ/h	12.0 kW

	LPG (Amplified Valve)	**Natural Gas (1:1 Valve)**
Burner Pressure		
Maximum	2300 Pa	400 Pa
Minimum	800 Pa	180 Pa
Injector Main Burner	3.4 mm	8 x 5mm Holes

Fan Motor	**Standard**	**Combustion Fan**	**Combustion Fan**
Model	Fasco	EBM	EBM
Model No.	80855BPVA-A12	R2E220-AA52-D4	R2E190-AE21-F2
Watts	650	80	75
Amps	4.3	0.34	0.32
Capacitor	25 uF	2 uF	1.5 uF
Fan Impellor Size	270 X 270mm (10" X 10")	220 mm	190 mm
Combustion Fan Air Signal – High	400 Pa		
Combustion Fan Air Signal – Low		250 - 300 Pa	

Return Air Grille Size	**Standard**	**XA**
With Filter	0.48 m^2	0.48 m^2
No Filter	0.3 m^2	0.3 m^2

Airflow (l/sec) @ Total Static Pressure	**50 Pa**	**75 Pa**	**100 Pa**	**125 Pa**
Standard	1200	1170	1140	1115
XA	1200	1180	1150	1120

Gas Valves: N/Gas (1:1) – SIT 848 SIGMA Code: 0848030.
LPG (25:1 Amplified) – VK8105R (1017) Code: -004 Amp Factor 25.

Speed Sensor: Tek 507.

Primary Heat Exchanger: 2mm Aluminised Steel.

Control Fuse: 2 Amp type 3AG.

Transformer: 2 Amp

Over Temperature Switch: Supply Air Compartment: (2) Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Supply Air Duct Thermistor: (90^{o}C) (10 kOHM @ 20^{o}C)

Electronic Heater Controller:

N-G1/lo. Low Voltage, electronic controller

FEATURES: Liquid Crystal Display screen to show unit operation status.
Installer system set-up function buttons.
2 Amps fuse (circuit protection).
24 Volt AC output terminal.
Thermistor input (Supply Air Terminal).

N-G1/hi. High Voltage, Power Output Module

FEATURES: Power supply input terminals.
Main fan power supply output terminals.
Combustion fan power supply output terminals.
N-G1/lo power supply output terminal.
Speed sensor (fan motor) input terminal.

Technical Information HE 20 External

AGA Approval No.: 5503 **Energy Label Star Rating:** 5.1 Stars 132 MJ/m^3/Year

Dimensions	**Width**	**Height**	**Depth**	**Weight**
Cabinet	898 mm	668 mm	388 mm	69.0 kg

Gas Type	**Natural Gas/LPG**			**Natural Gas**	**LPG**
Input (max)	80.0 MJ/h	22.0 kW	**Burner Pressure**		
Output (max)	72.0 MJ/h	20.0 kW	Maximum	790 Pa	2570 Pa
Input (min)	30.0 MJ/h	8.3 kW	Minimum	150 Pa	800 Pa
Output (max)	22.0 MJ/h	6.3 kW	**Injector Main Burner**	4.8 mm	2.7 mm
Fan Motor	**Standard**		**Combustion Fan**		
Model	Fasco		EBM		
Model No.	80855 BNVA-A20		R2E190-AE21-F2		
Watts	315		75		
Amps	4.2		0.32		
Capacitor	15 uF		1.5 uF		
Fan Impellor Size	240 X 180mm (9" X 7")		190 mm		
Combustion Fan Air Signal – High	400 Pa				
Combustion Fan Air Signal – Low	250 - 300 Pa				
Return Air Grille Size					
With Filter	0.26 m^2				
No Filter	0.15 m^2				

Airflow (l/sec) @ Total Static Pressure	**50 Pa**	**75 Pa**	**100 Pa**	**125 Pa**
Standard	565	550	530	505

Gas Valves: N/Gas – VK105R (1009) Code: -001 Amp Factor 5.
LPG – VK8105R (1017) Code: -004 Amp Factor 25.

Speed Sensor: Tek 507.

Primary Heat Exchanger: 2mm Aluminised Steel.

Secondary Heat Exchanger: 0.9mm, AL29-4C Stainless Steel, 29% Chromium.

Control Fuse: 2 Amp type 3AG.

Transformer: 2 Amp

Over Temperature Switch:

Supply Air Compartment: (2) Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Flue Outlet Pipe: Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Supply Air Duct Thermistor: (90^{o}C) (10 kOHM @ 20^{o}C)

Electronic Heater Controller:

N-G1/lo. Low Voltage, electronic controller

FEATURES:
- Liquid Crystal Display screen to show unit operation status.
- Installer system set-up function buttons.
- 2 Amps fuse (circuit protection).
- 24 Volt AC output terminal.
- Thermistor input (Supply Air Terminal).

N-G1/hi. High Voltage, Power Output Module

FEATURES:
- Power supply input terminals.
- Main fan power supply output terminals.
- Combustion fan power supply output terminals.
- N-G1/lo power supply output terminal.
- Speed sensor (fan motor) input terminal.

Technical Information HE 20 External V2

AGA Approval No.: 5503 **Energy Label Star Rating:** 5.1 Stars 132 MJ/m^3/Year

Dimensions	**Length**	**Width**	**Height**	**Weight**
Overall	990 mm	400 mm	680 mm	70.0 kg

Gas Type	**Natural Gas / LPG**	
Input (max)	80.0 MJ/h	22.0 kW
Output (max)	72.0 MJ/h	20.0 kW
Input (min)	30.0 MJ/h	8.3 kW
Output (min)	22.0 MJ/h	6.3 kW

	Natural Gas (Amplified Valve)	**LPG (Amplified Valve)**	**Natural Gas** (1:1 Valve)**
Burner Pressure			
Maximum	790 Pa	2570 Pa	400 Pa
Minimum	150 Pa	800 Pa	180 Pa
Injector Main Burner	4.8 mm	2.7 mm	2 SLOTS

Fan Motor	**Standard / XA**	**Combustion Fan**
Model	Fasco	EBM
Model No.	80855 BNVA-A20	R2E190-AE21-F2
Watts	315	75
Amps	4.2	0.32
Capacitor	15 uF	1.5 uF
Fan Impellor Size	240 X 180mm (9" X 7")	190 mm
Combustion Fan Air Signal – High	400 Pa	
Combustion Fan Air Signal – Low	250 - 300 Pa	

Return Air Grille Size	**Standard**	**XA**
With Filter	0.32 m^2	0.36 m^2
No Filter	0.17 m^2	0.19 m^2

Airflow (l/sec) @ Total Static Pressure	**50 Pa**	**75 Pa**	**100 Pa**	**125 Pa**
Standard	670	645	620	595
Extra Air (XA)	705	675	650	625

Gas Valves:** N/Gas (5:1 Amplified) – VK105R (1009) Code: -001 Amp Factor 5.
N/Gas (1:1) – VK8115V (1069)
LPG (25:1 Amplified) – VK8105R (1017) Code: -004 Amp Factor 25.

Speed Sensor: Tek 507.
Primary Heat Exchanger: 2mm Aluminised Steel.
Secondary Heat Exchanger: 0.89mm, (316) Stainless Steel.
Control Fuse: 2 Amp type 3AG.
Transformer: 2 Amp
Over Temperature Switch:

Supply Air Compartment: (2) Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Flue Outlet Pipe: Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Supply Air Duct Thermistor: (90^{o}C) (10 kOHM @ 20^{o}C)

Electronic Heater Controller:

N-G1/lo. Low Voltage, electronic controller

FEATURES:
- Liquid Crystal Display screen to show unit operation status.
- Installer system set-up function buttons.
- 2 Amps fuse (circuit protection).
- 24 Volt AC output terminal.
- Thermistor input (Supply Air Terminal).

N-G1/hi. High Voltage, Power Output Module

FEATURES:
- Power supply input terminals.
- Main fan power supply output terminals.
- Combustion fan power supply output terminals.
- N-G1/lo power supply output terminal.
- Speed sensor (fan motor) input terminal.

**** New 1:1 Gas Valves, Slot Type Injectors and lower burner pressures were introduced for Natural Gas versions of this model on the 18/03/02. Slot Type Injectors are not suitable for use on units with Amplified Gas Valves. 1:1 and Amplified Gas Valves are not interchangeable, always replace an Amplified with an Amplified and a 1:1 with a 1:1.**

Technical Information HE 20 External V3

AGA Approval No.: 5503 **Energy Label Star Rating:** 5.1 Stars 132 MJ/m^3/Year

Dimensions	**Length**	**Width**	**Height**	**Weight**
Overall	1130 mm	425 mm	795 mm	71.1 kg

Gas Type	**Natural Gas / LPG**	
Input (max)	80.0 MJ/h	22.0 kW
Output (max)	72.0 MJ/h	20.0 kW
Input (min)	30.0 MJ/h	8.3 kW
Output (min)	22.0 MJ/h	6.3 kW

	Natural Gas (1:1 Valve)	**LPG (Amplified Valve)**
Burner Pressure		
Maximum	420 Pa	2230 Pa
Minimum	180 Pa	800 Pa
Injector Main Burner	8 x 3mm Holes	2.9 mm

Fan Motor	**Standard / XA**	**Combustion Fan**
Model	Fasco	EBM
Model No.	80855 BNVA-A20	R2E190-AE21-F2
Watts	315	75
Amps	4.2	0.32
Capacitor	15 uF	1.5 uF
Fan Impellor Size	240 X 180mm (9" X 7")	190 mm
Combustion Fan Air Signal – High	400 Pa	
Combustion Fan Air Signal – Low	250 - 300 Pa	

Return Air Grille Size	**Standard**	**XA**
With Filter	0.39 m^2	0.40 m^2
No Filter	0.22 m^2	0.23 m^2

Airflow (l/sec) @ Total Static Pressure	**50 Pa**	**75 Pa**	**100 Pa**	**125 Pa**
Standard	725	695	665	630
Extra Air (XA)	835	810	790	760

Gas Valves: N/Gas (1:1) – SIT 848 SIGMA Code: 0848030.
LPG (25:1 Amplified) – VK8105R (1017) Code: -004 Amp Factor 25.

Speed Sensor: Tek 507.

Primary Heat Exchanger: 2mm Aluminised Steel.

Secondary Heat Exchanger: 0.89mm, (316) Stainless Steel.

Control Fuse: 2 Amp type 3AG.

Transformer: 2 Amp

Over Temperature Switch: Supply Air Compartment: (2) Texas Inst Klixon Oil 1747 L90 (Opens at 93°C).
Flue Outlet Pipe: Texas Inst Klixon Oil 1747 L90 (Opens at 93°C).
Supply Air Duct Thermistor: (90°C) (10 kOHM @ 20°C)

Electronic Heater Controller:

N-G1/lo. Low Voltage, electronic controller

FEATURES:
- Liquid Crystal Display screen to show unit operation status.
- Installer system set-up function buttons.
- 2 Amps fuse (circuit protection).
- 24 Volt AC output terminal.
- Thermistor input (Supply Air Terminal).

N-G1/hi. High Voltage, Power Output Module

FEATURES:
- Power supply input terminals.
- Main fan power supply output terminals.
- Combustion fan power supply output terminals.
- N-G1/lo power supply output terminal.
- Speed sensor (fan motor) input terminal.

Technical Information ME 20 External

AGA Approval No.: 5503 **Energy Label Star Rating:** 4.0 Stars 150 MJ/m^3/Year

Dimensions	**Width**	**Height**	**Depth**	**Weight**
Cabinet	898 mm	668 mm	388 mm	65.0 kg

Gas Type	**Natural Gas/LPG**		**Natural Gas**	**LPG**
Input (max)	88.0 MJ/h	24.0 kW	**Burner Pressure**	
Output (max)	72.0 MJ/h	20.0 kW	Maximum	770 Pa 2590 Pa
Input (min)	46.0 MJ/h	13.0 kW	Minimum	150 Pa 800 Pa
Output (max)	35.0 MJ/h	9.6 kW	**Injector Main Burner**	5.1 mm 2.7 mm

Fan Motor	**Standard**	**Combustion Fan**	
Model	Fasco	EBM	
Model No.	80855 BNVA-A20	R2E190-AE21-F2	
Watts	315	75	
Amps	4.2	0.32	
Capacitor	15 uF	1.5 uF	
Fan Impellor Size		240 X 180mm (9" X 7")	190 mm
Combustion Fan Air Signal – High		400 Pa	
Combustion Fan Air Signal – Low		250 - 300 Pa	

Return Air Grille Size

With Filter 0.26 m^2

No Filter 0.15 m^2

Airflow (l/sec) @ Total Static Pressure	**50 Pa**	**75 Pa**	**100 Pa**	**125 Pa**
Standard 565	550	530	505	

Gas Valves: N/Gas – VK105R (1009) Code: -001 Amp Factor 5.
LPG – VK8105R (1017) Code: -004 Amp Factor 25.

Speed Sensor: Tek 507.

Primary Heat Exchanger: 2mm Aluminised Steel.

Control Fuse: 2 Amp type 3AG.

Transformer: 2 Amp

Over Temperature Switch:

Supply Air Compartment: (2) Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).

Supply Air Duct Thermistor: (90^{o}C) (10 kOHM @ 20^{o}C)

Electronic Heater Controller:

N-G1/lo. Low Voltage, electronic controller

FEATURES: Liquid Crystal Display screen to show unit operation status.
Installer system set-up function buttons.
2 Amps fuse (circuit protection).
24 Volt AC output terminal.
Thermistor input (Supply Air Terminal).

N-G1/hi. High Voltage, Power Output Module

FEATURES: Power supply input terminals.
Main fan power supply output terminals.
Combustion fan power supply output terminals.
N-G1/lo power supply output terminal.
Speed sensor (fan motor) input terminal.

Technical Information ME 20 External V2

AGA Approval No.: 5503 **Energy Label Star Rating:** 4.0 Stars 151 MJ/m^3/Year

Dimensions	**Length**	**Width**	**Height**	**Weight**
Overall	990 mm	400 mm	680 mm	69.0 kg

Gas Type	**Natural Gas / LPG**	
Input (max)	88.0 MJ/h	24.0 kW
Output (max)	72.0 MJ/h	20.0 kW
Input (min)	46.0 MJ/h	13.0 kW
Output (mIn)	35.0 MJ/h	9.6 kW

	Natural Gas (Amplified Valve)	**LPG (Amplified Valve)**	**Natural Gas** (1:1 Valve)**
Burner Pressure			
Maximum	770 Pa	2590 Pa	400 Pa
Minimum	150 Pa	800 Pa	180 Pa
Injector Main Burner	5.1 mm	2.7 mm	2 SLOTS

Fan Motor	**Standard / XA**	**Combustion Fan**
Model	Fasco	EBM
Model No.	80855 BNVA-A20	R2E190-AE21-F2
Watts	315	75
Amps	4.2	0.32
Capacitor	15 uF	1.5 uF
Fan Impellor Size	240 X 180mm (9" X 7")	190 mm
Combustion Fan Air Signal – High	400 Pa	
Combustion Fan Air Signal – Low	250 - 300 Pa	

Return Air Grille Size	**Standard**	**XA**
With Filter	0.32 m^2	0.36 m^2
No Filter	0.17 m^2	0.19 m^2

Airflow (l/sec) @ Total Static Pressure	**50 Pa**	**75 Pa**	**100 Pa**	**125 Pa**
Standard	670	645	620	595
Extra Air (XA)	705	675	650	625

Gas Valves:** N/Gas (5:1 Amplified) – VK105R (1009) Code: -001 Amp Factor 5.
N/Gas (1:1) – VK8115V (1069).
LPG (25:1 Amplified) – VK8105R (1017) Code: -004 Amp Factor 25.

Speed Sensor: Tek 507.
Primary Heat Exchanger: 2mm Aluminised Steel.
Control Fuse: 2 Amp type 3AG.
Transformer: 2 Amp
Over Temperature Switch:

Supply Air Compartment: (2) Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Supply Air Duct Thermistor: (90^{o}C) (10 kOHM @ 20^{o}C)

Electronic Heater Controller:

N-G1/lo. Low Voltage, electronic controller

FEATURES:
- Liquid Crystal Display screen to show unit operation status.
- Installer system set-up function buttons.
- 2 Amps fuse (circuit protection).
- 24 Volt AC output terminal.
- Thermistor input (Supply Air Terminal).

N-G1/hi. High Voltage, Power Output Module

FEATURES:
- Power supply input terminals.
- Main fan power supply output terminals.
- Combustion fan power supply output terminals.
- N-G1/lo power supply output terminal.
- Speed sensor (fan motor) input terminal.

**** New 1:1 Gas Valves, Slot Type Injectors & lower burner pressures were introduced for Natural Gas versions of this model on the 18/03/02. Slot Type Injectors are not suitable for use on units with Amplified Gas Valves. 1:1 and Amplified Gas Valves are not interchangeable, always replace an Amplified with an Amplified and a 1:1 with a 1:1.**

Technical Information ME 20 External V3

AGA Approval No.: 5503 **Energy Label Star Rating:** 4.0 Stars 151 MJ/m^3/Year

Dimensions	**Length**	**Width**	**Height**	**Weight**
Overall	1130 mm	425 mm	795 mm	70.0 kg

Gas Type	**Natural Gas / LPG**	
Input (max)	88.0 MJ/h	24.0 kW
Output (max)	72.0 MJ/h	20.0 kW
Input (min)	46.0 MJ/h	13.0 kW
Output (mIn)	35.0 MJ/h	9.6 kW

	Natural Gas (1:1 Valve)	**LPG (Amplified Valve)**
Burner Pressure		
Maximum	420 Pa	2320 Pa
Minimum	180 Pa	800 Pa
Injector Main Burner	8 x 3mm Holes	3.0 mm

Fan Motor	**Standard / XA**	**Combustion Fan**
Model	Fasco	EBM
Model No.	80855 BNVA-A20	R2E190-AE21-F2
Watts	315	75
Amps	4.2	0.32
Capacitor	15 uF	1.5 uF
Fan Impellor Size	240 X 180mm (9" X 7")	190 mm
Combustion Fan Air Signal – High	400 Pa	
Combustion Fan Air Signal – Low	250 - 300 Pa	

Return Air Grille Size	**Standard**	**XA**
With Filter	0.39 m^2	0.40 m^2
No Filter	0.22 m^2	0.23 m^2

Airflow (l/sec) @ Total Static Pressure	**50 Pa**	**75 Pa**	**100 Pa**	**125 Pa**
Standard	725	695	665	630
Extra Air (XA)	835	810	790	760

Gas Valves: N/Gas (1:1) – SIT 848 SIGMA Code: 0848030.
LPG (25:1 Amplified) – VK8105R (1017) Code: -004 Amp Factor 25.

Speed Sensor: Tek 507.

Primary Heat Exchanger: 2mm Aluminised Steel.

Control Fuse: 2 Amp type 3AG.

Transformer: 2 Amp

Over Temperature Switch: Supply Air Compartment: (2) Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Supply Air Duct Thermistor: (90^{o}C) (10 kOHM @ 20^{o}C)

Electronic Heater Controller:

N-G1/lo. Low Voltage, electronic controller

FEATURES: Liquid Crystal Display screen to show unit operation status.
Installer system set-up function buttons.
2 Amps fuse (circuit protection).
24 Volt AC output terminal.
Thermistor input (Supply Air Terminal).

N-G1/hi. High Voltage, Power Output Module

FEATURES: Power supply input terminals.
Main fan power supply output terminals.
Combustion fan power supply output terminals.
N-G1/lo power supply output terminal.
Speed sensor (fan motor) input terminal.

Technical Information HE 20 Internal

AGA Approval No.: 5503 **Energy Label Star Rating:** 5.1 Stars 132 MJ/m^3/Year

Dimensions	**Width**	**Height**	**Depth**	**Weight**
Cabinet	976 mm	459 mm	664 mm	71.0 kg

Gas Type	**Natural Gas/LPG**			**Natural Gas**	**LPG**
Input (max)	80.0 MJ/h	22.0 kW	**Burner Pressure**		
Output (max)	72.0 MJ/h	20.0 kW	Maximum	790 Pa	2570 Pa
Input (min)	30.0 MJ/h	8.3 kW	Minimum	150 Pa	800 Pa
Output (max)	22.0 MJ/h	6.3 kW	**Injector Main Burner**	4.8 mm	2.7 mm
Fan Motor	**Standard**		**Combustion Fan**		
Model	Fasco		EBM		
Model No.	80855 BNVA-A20		R2E190-AE21-F2		
Watts	315		75		
Amps	4.2		0.32		
Capacitor	15 uF		1.5 uF		
Fan Impellor Size	240 X 180mm (9" X 7")		190 mm		
Combustion Fan Air Signal – High	400 Pa				
Combustion Fan Air Signal – Low	250 - 300 Pa				
Return Air Grille Size					
With Filter	0.26 m^2				
No Filter	0.15 m^2				

Airflow (l/sec) @ Total Static Pressure	**50 Pa**	**75 Pa**	**100 Pa**	**125 Pa**
Standard	580	560	535	505

Gas Valves: N/Gas – VK105R (1009) Code: -001 Amp Factor 5.
LPG – VK8105R (1017) Code: -004 Amp Factor 25.

Speed Sensor: Tek 507.

Primary Heat Exchanger: 2mm Aluminised Steel.

Secondary Heat Exchanger: 0.9mm, AL29-4C Stainless Steel, 29% Chromium.

Control Fuse: 2 Amp type 3AG.

Transformer: 2 Amp

Over Temperature Switch:

Supply Air Compartment: (2) Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Flue Outlet Pipe: Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Supply Air Duct Thermistor: (90^{o}C) (10 kOHM @ 20^{o}C)

Electronic Heater Controller:

N-G1/lo. Low Voltage, electronic controller

FEATURES:
- Liquid Crystal Display screen to show unit operation status.
- Installer system set-up function buttons.
- 2 Amps fuse (circuit protection).
- 24 Volt AC output terminal.
- Thermistor input (Supply Air Terminal)

N-G1/hi. High Voltage, Power Output Module

FEATURES:
- Power supply input terminals.
- Main fan power supply output terminals.
- Combustion fan power supply output terminals.
- N-G1/lo power supply output terminal.
- Speed sensor (fan motor) input terminal.

Technical Information HE 20 Internal V2

AGA Approval No.:	5503	**Energy Label Star Rating:** 5.1 Stars		132 MJ/m^3/Year
Dimensions	**Length**	**Width**	**Height**	**Weight**
Overall	1005 mm	685 mm	460 mm	72.0 kg
Gas Type	**Natural Gas / LPG**			
Input (max)	80.0 MJ/h	22.0 kW		
Output (max)	72.0 MJ/h	20.0 kW		
Input (min)	30.0 MJ/h	8.3 kW		
Output (min)	22.0 MJ/h	6.3 kW		

	Natural Gas (Amplified Valve)	**LPG (Amplified Valve)**	**Natural Gas** (1:1 Valve)**
Burner Pressure			
Maximum	790 Pa	2570 Pa	400 Pa
Minimum	150 Pa	800 Pa	180 Pa
Injector Main Burner	4.8 mm	2.7 mm	2 SLOTS

Fan Motor	**Standard / XA**	**Combustion Fan**
Model	Fasco	EBM
Model No.	80855 BNVA-A20	R2E190-AE21-F2
Watts	315	75
Amps	4.2	0.32
Capacitor	15 uF	1.5 uF
Fan Impellor Size	240 X 180mm (9" X 7")	190 mm
Combustion Fan Air Signal – High	400 Pa	
Combustion Fan Air Signal – Low		250 - 300 Pa

Return Air Grille Size	**Standard**	**XA**
With Filter	0.32 m^2	0.36 m^2
No Filter	0.17 m^2	0.19 m^2

Airflow (l/sec) @ Total Static Pressure	**50 Pa**	**75 Pa**	**100 Pa**	**125 Pa**
Standard	675	650	625	600
Extra Air (XA)	765	735	715	695

Gas Valves:** N/Gas (5:1 Amplified) – VK105R (1009) Code: -001 Amp Factor 5.
N/Gas (1:1) – VK8115V (1069).
LPG (25:1 Amplified) – VK8105R (1017) Code: -004 Amp Factor 25.

Speed Sensor: Tek 507.
Primary Heat Exchanger: 2mm Aluminised Steel.
Secondary Heat Exchanger: 0.89mm, (316) Stainless Steel.
Control Fuse: 2 Amp type 3AG.
Transformer: 2 Amp
Over Temperature Switch:
Supply Air Compartment: (2) Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Flue Outlet Pipe: Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Supply Air Duct Thermistor: (90^{o}C) (10 kOHM @ 20^{o}C)

Electronic Heater Controller:
N-G1/lo. Low Voltage, electronic controller
FEATURES:
- Liquid Crystal Display screen to show unit operation status.
- Installer system set-up function buttons.
- 2 Amps fuse (circuit protection).
- 24 Volt AC output terminal.
- Thermistor input (Supply Air Terminal)

N-G1/hi. High Voltage, Power Output Module
FEATURES:
- Power supply input terminals.
- Main fan power supply output terminals.
- Combustion fan power supply output terminals.
- N-G1/lo power supply output terminal.
- Speed sensor (fan motor) input terminal.

**** New 1:1 Gas Valves, Slot Type Injectors & lower burner pressures were introduced for Natural Gas versions of this model on the 18/03/02. Slot Type Injectors are not suitable for use on units with Amplified Gas Valves. 1:1 and Amplified Gas Valves are not interchangeable, always replace an Amplified with an Amplified and a 1:1 with a 1:1.**

Technical Information HE 20 Internal V3

AGA Approval No.: 5503 **Energy Label Star Rating:** 5.1 Stars 132 MJ/m^3/Year

Dimensions	**Length**	**Width**	**Height**	**Weight**
Overall	1065 mm	396 mm	660 mm	62.7 kg

Gas Type	**Natural Gas / LPG**	
Input (max)	80.0 MJ/h	22.0 kW
Output (max)	72.0 MJ/h	20.0 kW
Input (min)	30.0 MJ/h	8.3 kW
Output (min)	22.0 MJ/h	6.3 kW

	Natural Gas (1:1 Valve)	**LPG (Amplified Valve)**
Burner Pressure		
Maximum	420 Pa	2230 Pa
Minimum	180 Pa	800 Pa
Injector Main Burner	8 x 3mm Holes	2.9 mm

Fan Motor	**Standard / XA**	**Combustion Fan**
Model	Fasco	EBM
Model No.	80855 BNVA-A20	R2E190-AE21-F2
Watts	315	75
Amps	4.2	0.32
Capacitor	15 uF	1.5 uF
Fan Impellor Size	240 X 180mm (9" X 7")	190 mm
Combustion Fan Air Signal – High	400 Pa	
Combustion Fan Air Signal – Low		250 - 300 Pa

Return Air Grille Size	**Standard**	**XA**
With Filter	0.39 m^2	0.40 m^2
No Filter	0.22 m^2	0.23 m^2

Airflow (l/sec) @ Total Static Pressure	**50 Pa**	**75 Pa**	**100 Pa**	**125 Pa**
Standard	765	745	720	690
Extra Air (XA)	860	830	800	770

Gas Valves: N/Gas (1:1) – SIT 848 SIGMA Code: 0848030.
LPG (25:1 Amplified) – VK8105R (1017) Code: -004 Amp Factor 25.

Speed Sensor: Tek 507.

Primary Heat Exchanger: 2mm Aluminised Steel.

Secondary Heat Exchanger: 0.89mm, (316) Stainless Steel.

Control Fuse: 2 Amp type 3AG.

Transformer: 2 Amp

Over Temperature Switch: Supply Air Compartment: (2) Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Flue Outlet Pipe: Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Supply Air Duct Thermistor: (90^{o}C) (10 kOHM @ 20^{o}C)

Electronic Heater Controller:

N-G1/lo. Low Voltage, electronic controller

FEATURES:
- Liquid Crystal Display screen to show unit operation status.
- Installer system set-up function buttons.
- 2 Amps fuse (circuit protection).
- 24 Volt AC output terminal.
- Thermistor input (Supply Air Terminal)

N-G1/hi. High Voltage, Power Output Module

FEATURES:
- Power supply input terminals.
- Main fan power supply output terminals.
- Combustion fan power supply output terminals.
- N-G1/lo power supply output terminal.
- Speed sensor (fan motor) input terminal.

Technical Information ME 20 Internal

AGA Approval No.: 5503 **Energy Label Star Rating:** 4.0 Stars 150 MJ/m^3/Year

Dimensions	**Width**	**Height**	**Depth**	**Weight**
Cabinet	976 mm	459 mm	664 mm	70.0 kg

Gas Type	**Natural Gas / LPG**			**Natural Gas**	**LPG**
Input (max)	88.0 MJ/h	24.0 kW	**Burner Pressure**		
Output (max)	72.0 MJ/h	20.0 kW	Maximum	770 Pa	2590 Pa
Input (min)	46.0 MJ/h	13.0 kW	Minimum	150 Pa	800 Pa
Output (max)	35.0 MJ/h	9.6 kW	**Injector Main Burner**	5.1 mm	2.7 mm

Fan Motor	**Standard**	**Combustion Fan**
Model	Fasco	EBM
Model No.	80855 BNVA-A20	R2E190-AE21-F2
Watts	315	75
Amps	4.2	0.32
Capacitor	15 uF	1.5 uF
Fan Impellor Size	240 X 180mm (9" X 7")	190 mm

Combustion Fan Air Signal – High	400 Pa
Combustion Fan Air Signal – Low	250 - 300 Pa

Return Air Grille Size

With Filter	0.26 m^2
No Filter	0.15 m^2

Airflow (l/sec) @ Total Static Pressure	**50 Pa**	**75 Pa**	**100 Pa**	**125 Pa**
Standard	580	560	535	505

Gas Valves: N/Gas – VK105R (1009) Code: -001 Amp Factor 5.
LPG – VK8105R (1017) Code: -004 Amp Factor 25.

Speed Sensor: Tek 507.

Primary Heat Exchanger: 2mm Aluminised Steel.

Control Fuse: 2 Amp type 3AG.

Transformer: 2 Amp

Over Temperature Switch:

Supply Air Compartment: (2) Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Supply Air Duct Thermistor: (90^{o}C) (10 kOHM @ 20^{o}C)

Electronic Heater Controller:

N-G1/lo. Low Voltage, electronic controller

FEATURES:
- Liquid Crystal Display screen to show unit operation status.
- Installer system set-up function buttons.
- 2 Amps fuse (circuit protection).
- 24 Volt AC output terminal.
- Thermistor input (Supply Air Terminal).

N-G1/hi. High Voltage, Power Output Module

FEATURES:
- Power supply input terminals.
- Main fan power supply output terminals.
- Combustion fan power supply output terminals.
- N-G1/lo power supply output terminal.
- Speed sensor (fan motor) input terminal.

Technical Information ME 20 Internal V2

AGA Approval No.: 5503 **Energy Label Star Rating:** 4.0 Stars 151 MJ/m^3/Year

Dimensions	**Length**	**Width**	**Height**	**Weight**
Overall	1005 mm	685 mm	460 mm	71.0 kg

Gas Type	**Natural Gas / LPG**	
Input (max)	88.0 MJ/h	24.0 kW
Output (max)	72.0 MJ/h	20.0 kW
Input (min)	46.0 MJ/h	13.0 kW
Output (min)	35.0 MJ/h	9.6 kW

	Natural Gas (Amplified Valve)	**LPG (Amplified Valve)**	**Natural Gas** (1:1 Valve)**
Burner Pressure			
Maximum	770 Pa	2590 Pa	400 Pa
Minimum	150 Pa	800 Pa	180 Pa
Injector Main Burner	5.1 mm	2.7 mm	2 SLOTS

Fan Motor	**Standard / XA**	**Combustion Fan**
Model	Fasco	EBM
Model No.	80855 BNVA-A20	R2E190-AE21-F2
Watts	315	75
Amps	4.2	0.32
Capacitor	15 uF	1.5 uF
Fan Impellor Size	240 X 180mm (9" X 7")	190 mm
Combustion Fan Air Signal – High	400 Pa	
Combustion Fan Air Signal – Low	250 - 300 Pa	

Return Air Grille Size	**Standard**	**XA**
With Filter	0.32 m^2	0.36 m^2
No Filter	0.17 m^2	0.19 m^2

Airflow (l/sec) @ Total Static Pressure	**50 Pa**	**75 Pa**	**100 Pa**	**125 Pa**
Standard	675	650	625	600
Extra Air (XA)	765	735	715	695

Gas Valves:** N/Gas (5:1 Amplified) – VK105R (1009) Code: -001 Amp Factor 5.
N/Gas (1:1) – VK8115V (1069).
LPG (25:1 Amplified) – VK8105R (1017) Code: -004 Amp Factor 25.

Speed Sensor: Tek 507.
Primary Heat Exchanger: 2mm Aluminised Steel.
Control Fuse: 2 Amp type 3AG.
Transformer: 2 Amp
Over Temperature Switch:
Supply Air Compartment: (2) Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Supply Air Duct Thermistor: (90^{o}C) (10 kOHM @ 20^{o}C)

Electronic Heater Controller:
N-G1/lo. Low Voltage, electronic controller
FEATURES:
Liquid Crystal Display screen to show unit operation status.
Installer system set-up function buttons.
2 Amps fuse (circuit protection).
24 Volt AC output terminal.
Thermistor input (Supply Air Terminal)

N-G1/hi. High Voltage, Power Output Module
FEATURES:
Power supply input terminals.
Main fan power supply output terminals.
Combustion fan power supply output terminals.
N-G1/lo power supply output terminal.
Speed sensor (fan motor) input terminal.

**** New 1:1 Gas Valves, Slot Type Injectors & lower burner pressures were introduced for Natural Gas versions of this model on the 18/03/02. Slot Type Injectors are not suitable for use on units with Amplified Gas Valves. 1:1 and Amplified Gas Valves are not interchangeable, always replace an Amplified with an Amplified and a 1:1 with a 1:1.**

Technical Information ME 20 Internal V3

AGA Approval No.: 5503 **Energy Label Star Rating:** 4.0 Stars 151 MJ/m3/Year

Dimensions	**Length**	**Width**	**Height**	**Weight**
Overall	1065 mm	396 mm	660 mm	61.0 kg

Gas Type	**Natural Gas / LPG**	
Input (max)	88.0 MJ/h	24.0 kW
Output (max)	72.0 MJ/h	20.0 kW
Input (min)	46.0 MJ/h	13.0 kW
Output (min)	35.0 MJ/h	9.6 kW

	Natural Gas (1:1 Valve)	**LPG (Amplified Valve)**
Burner Pressure		
Maximum	420 Pa	2320 Pa
Minimum	180 Pa	800 Pa
Injector Main Burner	8 x 3mm Holes	3.0 mm

Fan Motor	**Standard / XA**	**Combustion Fan**
Model	Fasco	EBM
Model No.	80855 BNVA-A20	R2E190-AE21-F2
Watts	315	75
Amps	4.2	0.32
Capacitor	15 uF	1.5 uF
Fan Impellor Size	240 X 180mm (9" X 7")	190 mm
Combustion Fan Air Signal – High	400 Pa	
Combustion Fan Air Signal – Low	250 - 300 Pa	

Return Air Grille Size	**Standard**	**XA**
With Filter	0.39 m^2	0.40 m^2
No Filter	0.22 m^2	0.23 m^2

Airflow (l/sec) @ Total Static Pressure	**50 Pa**	**75 Pa**	**100 Pa**	**125 Pa**
Standard	765	745	720	690
Extra Air (XA)	890	830	800	770

Gas Valves: N/Gas (1:1) – SIT 848 SIGMA Code: 0848030.
LPG (25:1 Amplified) – VK8105R (1017) Code: -004 Amp Factor 25.

Speed Sensor: Tek 507.

Primary Heat Exchanger: 2mm Aluminised Steel.

Control Fuse: 2 Amp type 3AG.

Transformer: 2 Amp

Over Temperature Switch: Supply Air Compartment: (2) Texas Inst Klixon Oil 1747 L90 (Opens at 93^{o}C).
Supply Air Duct Thermistor: (90^{o}C) (10 kOHM @ 20^{o}C)

Electronic Heater Controller: N-G1/lo. Low Voltage, electronic controller

FEATURES: Liquid Crystal Display screen to show unit operation status.
Installer system set-up function buttons.
2 Amps fuse (circuit protection).
24 Volt AC output terminal.
Thermistor input (Supply Air Terminal)

N-G1/hi. High Voltage, Power Output Module

FEATURES: Power supply input terminals.
Main fan power supply output terminals.
Combustion fan power supply output terminals.
N-G1/lo power supply output terminal.
Speed sensor (fan motor) input terminal.

Technical Information EMS 26e

AGA Approval No.: 3183 **Energy Label Star Rating:** 2.4 Stars 188 MJ/m^3/Year

Dimensions	**Width**	**Height**	**Depth**	**Weight**
Cabinet	565 mm	1160 mm	1320 mm	114.0 kg

Gas Type	**Natural Gas / LPG**		**Natural Gas**	**LPG**
Input (max)	120.0 MJ/h	33.5 kW	**Burner Pressure**	
Output (max)	94.0 MJ/h	26.0 kW	Maximum	872 Pa	2600 Pa
Input (min)	90.0 MJ/h	25.0 kW	Minimum	500 Pa	2000 Pa
Output (max)	70.5 MJ/h	19.5 kW		
			Gas Injector Orifice	
			Main Burner	1.95 mm	1.15 mm
			Zip Burner	0.85 mm	0.50 mm
			Pilot Burner	0.50 mm	0.25 mm

Fan Motor	**Standard**	**Extra Air (XA)**
Model	Fasco	Fasco
Model No.	80855BPVA-A13	80855BPVA-A12
Watts	500	650
Amps	3.0	4.3
Capacitor	15 uF	25 uF
Fan Impellor Size	270 X 270mm (10” X 10”)	270 X 270mm (10” X 10”)
Return Air Grille Size		
With Filter	0.34 m^2	0.38 m^2
No Filter	0.20 m^2	0.23 m^2

Airflow (l/sec) @ Total Static Pressure	**50 Pa**	**75 Pa**	**100 Pa**	**125 Pa**
Standard	850	825	795	775
Extra Air (XA)	990	965	930	890

Gas Valves: VR8601P - NG (Grey Cap) 1.5-20 mbar, LPG (Orange Cap) 8-50 mbar.
Speed Sensor: Tek 507.
Primary Heat Exchanger: Aluminised Steel.
Control Fuse: 2 Amp type 3AG.
Transformer: 1.75 Amp.
Over Temperature Switch:

Fan Compartment: Texas Inst. Klixon oil 1747 L90 (Opens 93^{o}C).
Supply Air Compartment: Texas Inst. Klixon oil 1747 L90 (Opens 93^{o}C).
Supply Air Duct Thermistor: (90^{o}C.) (10 kOHM @ 20^{o}C.).

Electronic Heater Controller:

N-G1/lo. Low Voltage, electronic controller

FEATURES:
- Liquid Crystal Display screen to show unit operation status.
- Installer system set-up function buttons.
- 2 Amps fuse (circuit protection)
- 24 Volt AC output terminal

N-G1/hi. High Voltage, Power Output Module

FEATURES:
- Power supply input terminals.
- Main fan power supply output terminals.
- Combustion fan power supply output terminals.
- N-G1/lo power supply output terminal.
- Speed sensor (fan motor) input terminal.
- Thermistor input (Supply Air) terminal.

Technical Information EMS 26i

AGA Approval No.: 2593 **Energy Label Star Rating:** 2.1 Stars 197 MJ/m^3/Year

Dimensions	**Width**	**Height**	**Depth**	**Weight**
Cabinet	560 mm	820 mm	1110 mm	89.0 kg

Gas Type	**Natural Gas / LPG**			**Natural Gas**	**LPG**
Input (max)	120.0 MJ/h	33.5 kW	**Burner Pressure**		
Output (max)	94.0 MJ/h	26.0 kW	Maximum	872 Pa	2600 Pa
Input (min)	90.0 MJ/h	25.0 kW	Minimum	500 Pa	2000 Pa
Output (max)	70.5 MJ/h	19.5 kW			
			Gas Injector Orifice		
			Main Burner	1.95 mm	1.15 mm
			Zip Burner	0.85 mm	0.50 mm
			Pilot Burner	0.50 mm	0.25 mm

Fan Motor	**Standard**	**Extra Air (XA)**
Model	Fasco	Fasco
Model No.	80855BPVA-A13	80855BPVA-A12
Watts	500	650
Amps	3.0	4.3
Capacitor	15 uF	25 uF
Fan Impellor Size	270 X 270mm (10" X 10")	270 X 270mm (10" X 10")
Return Air Grille Size		
With Filter	0.34 m^2	0.38 m^2
No Filter	0.20 m^2	0.23 m^2

Airflow (l/sec) @ Total Static Pressure	**50 Pa**	**75 Pa**	**100 Pa**	**125 Pa**
Standard	860	825	800	775
Extra Air (XA)	970	950	925	880

Gas Valves: VR8601P - NG (Grey Cap) 1.5-20 mbar, LPG (Orange Cap) 8-50 mbar.
Speed Sensor: Tek 507.
Primary Heat Exchanger: Aluminised Steel.
Control Fuse: 2 Amp type 3AG.
Transformer: 1.75 Amp.
Over Temperature Switch:

Fan Compartment: Texas Inst. Klixon oil 1747 L90 (Opens 93^{o}C).
Supply Air Compartment: Texas Inst. Klixon oil 1747 L90 (Opens 93^{o}C).
Supply Air Duct Thermistor: (90^{o}C.) (10 kOHM @ 20^{o}C.).

Electronic Heater Controller:

N-G1/lo. Low Voltage, electronic controller

FEATURES:
- Liquid Crystal Display screen to show unit operation status.
- Installer system set-up function buttons.
- 2 Amps fuse (circuit protection)
- 24 Volt AC output terminal

N-G1/hi. High Voltage, Power Output Module

FEATURES:
- Power supply input terminals.
- Main fan power supply output terminals.
- Combustion fan power supply output terminals.
- N-G1/lo power supply output terminal.
- Speed sensor (fan motor) input terminal.
- Thermistor input (Supply Air) terminal.

Technical Information EMS 20e

AGA Approval No.: 3183 **Energy Label Star Rating:** 3.1 Stars 169 MJ/m^3/Year

Dimensions	**Width**	**Height**	**Depth**	**Weight**
Cabinet	395 mm	1120 mm	1090 mm	74.0 kg

Gas Type	**Natural Gas / LPG**	
Input (max)	85.0 MJ/h	24.0 kW
Output (max)	65.5 MJ/h	18.5 kW
Input (min)	60.0 MJ/h	16.5 kW
Output (max)	46.0 MJ/h	13.0 kW

	Natural Gas	**LPG**
Burner Pressure		
Maximum	840 Pa	2600 Pa
Minimum	450 Pa	2000 Pa
Gas Injector Orifice		
Main Burner	1.95 mm	1.15 mm
Zip Burner	0.75 mm	0.45 mm
Pilot Burner	0.50 mm	0.25 mm

Fan Motor	**Standard**	**Extra Air (XA)**
Model	Fasco	Fasco
Model No.	808554MVA-A13	80855BNVA-A20
Watts	250	315
Amps	2	4.2
Capacitor	4 uF	15 uF
Fan Impellor Size	240 X 180mm (9" X 7")	240 X 180mm (9" X 7")

Return Air Grille Size		
With Filter	0.24 m^2	0.28 m^2
No Filter	0.14 m^2	0.16 m^2

Airflow (l/sec) @ Total Static Pressure	**50 Pa**	**75 Pa**	**100 Pa**	**125 Pa**
Standard	430	405	390	380
Extra Air (XA)	540	500	480	455

Gas Valves: VR8601P - NG (Grey Cap) 1.5-20 mbar, LPG (Orange Cap) 8-50 mbar.
Speed Sensor: Tek 507.
Primary Heat Exchanger: Aluminised Steel.
Control Fuse: 2 Amp type 3AG.
Transformer: 1.75 Amp.
Over Temperature Switch:

Fan Compartment: Texas Inst. Klixon oil 1747 L90 (Opens 93^{o}C).
Supply Air Compartment: Texas Inst. Klixon oil 1747 L90 (Opens 93^{o}C).
Supply Air Duct Thermistor: (90^{o}C.) (10 kOHM @ 20^{o}C.).

Electronic Heater Controller:

N-G1/lo. Low Voltage, electronic controller

FEATURES:
- Liquid Crystal Display screen to show unit operation status.
- Installer system set-up function buttons.
- 2 Amps fuse (circuit protection)
- 24 Volt AC output terminal

N-G1/hi. High Voltage, Power Output Module

FEATURES:
- Power supply input terminals.
- Main fan power supply output terminals.
- Combustion fan power supply output terminals.
- N-G1/lo power supply output terminal.
- Speed sensor (fan motor) input terminal.
- Thermistor input (Supply Air) terminal.

Technical Information EMS 20i

AGA Approval No.: 2593 **Energy Label Star Rating:** 2.5 Stars 185 MJ/m^3/Year

Dimensions	**Width**	**Height**	**Depth**	**Weight**
Cabinet	400 mm	720 mm	1010 mm	65.0 kg

Gas Type	**Natural Gas/LPG**	
Input (max)	92.0 MJ/h	25.5 kW
Output (max)	73.0 MJ/h	20.5 kW
Input (min)	60.0 MJ/h	16.5 kW
Output (max)	46.0 MJ/h	13.0 kW

	Natural Gas	**LPG**
Burner Pressure		
Maximum	872 Pa	2600 Pa
Minimum	450 Pa	2000 Pa
Gas Injector Orifice		
Main Burner	1.95 mm	1.15 mm
Zip Burner	0.75 mm	0.45 mm
Pilot Burner	0.50 mm	0.25 mm

Fan Motor	**Standard**	**Extra Air (XA)**
Model	Fasco	Fasco
Model No.	808554MVA-A13	80855BNVA-A20
Watts	250	315
Amps	2	4.2
Capacitor	4 uF	15 uF
Fan Impellor Size	240 X 180mm (9" X 7")	240 X 180mm (9" X 7")

Return Air Grille Size		
With Filter	0.24 m^2	0.28 m^2
No Filter	0.14 m^2	0.16 m^2

Airflow (l/sec) @ Total Static Pressure	**50 Pa**	**75 Pa**	**100 Pa**	**125 Pa**
Standard	440	420	400	380
Extra Air (XA)	555	535	510	490

Gas Valves: VR8601P - NG (Grey Cap) 1.5-20 mbar, LPG (Orange Cap) 8-50 mbar.
Speed Sensor: Tek 507.
Primary Heat Exchanger: Aluminised Steel.
Control Fuse: 2 Amp type 3AG.
Transformer: 1.75 Amp.
Over Temperature Switch:

Fan Compartment: Texas Inst. Klixon oil 1747 L90 (Opens 93^{o}C).
Supply Air Compartment: Texas Inst. Klixon oil 1747 L90 (Opens 93^{o}C).
Supply Air Duct Thermistor: (90^{o}C.) (10 kOHM @ 20^{o}C.).

Electronic Heater Controller:

N-G1/lo. Low Voltage, electronic controller

FEATURES:
- Liquid Crystal Display screen to show unit operation status.
- Installer system set-up function buttons.
- 2 Amps fuse (circuit protection)
- 24 Volt AC output terminal

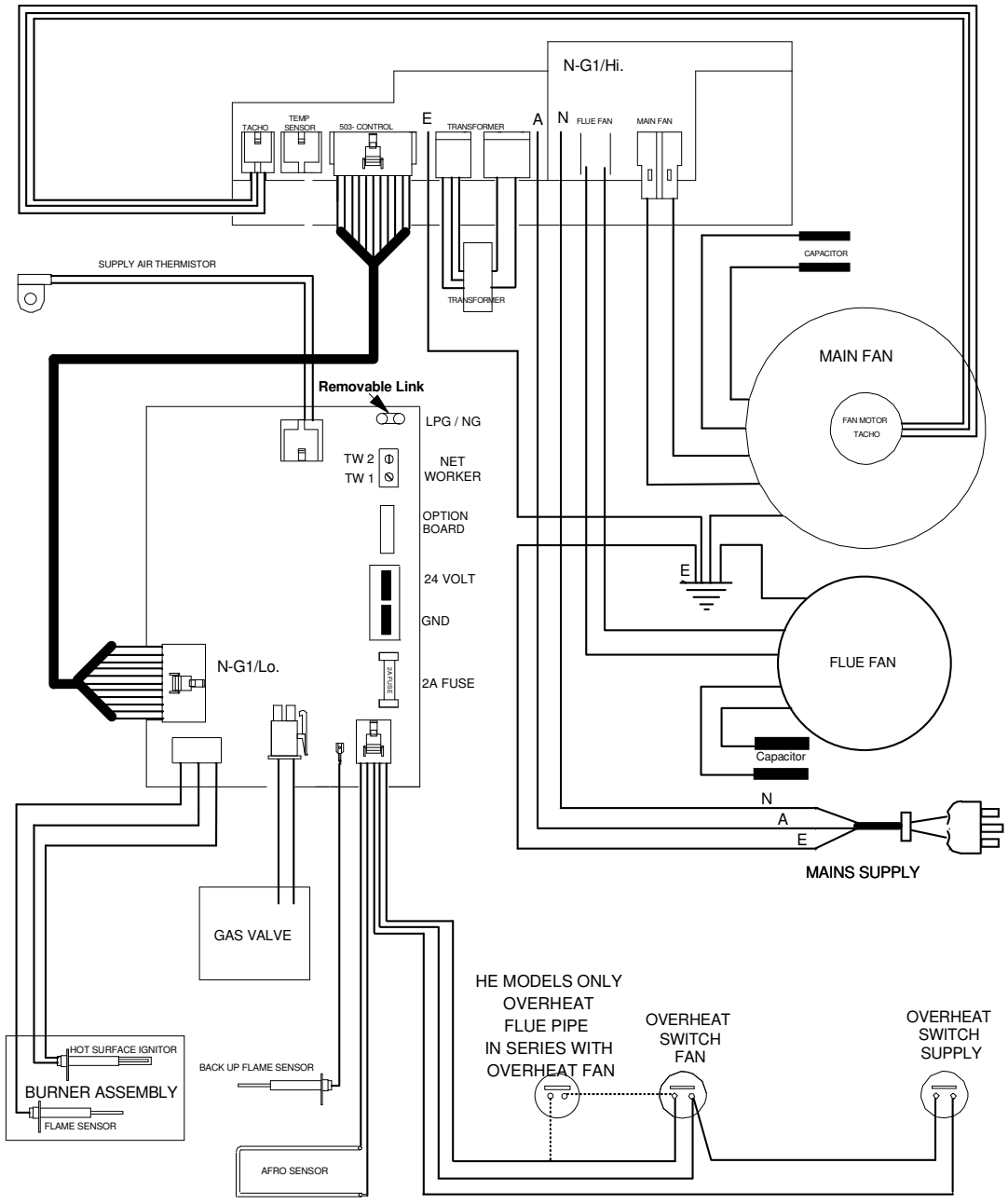
N-G1/hi. High Voltage, Power Output Module

FEATURES:
- Power supply input terminals.
- Main fan power supply output terminals.
- Combustion fan power supply output terminals.
- N-G1/lo power supply output terminal.
- Speed sensor (fan motor) input terminal.
- Thermistor input (Supply Air) terminal.

Technical Information

Wiring Diagram

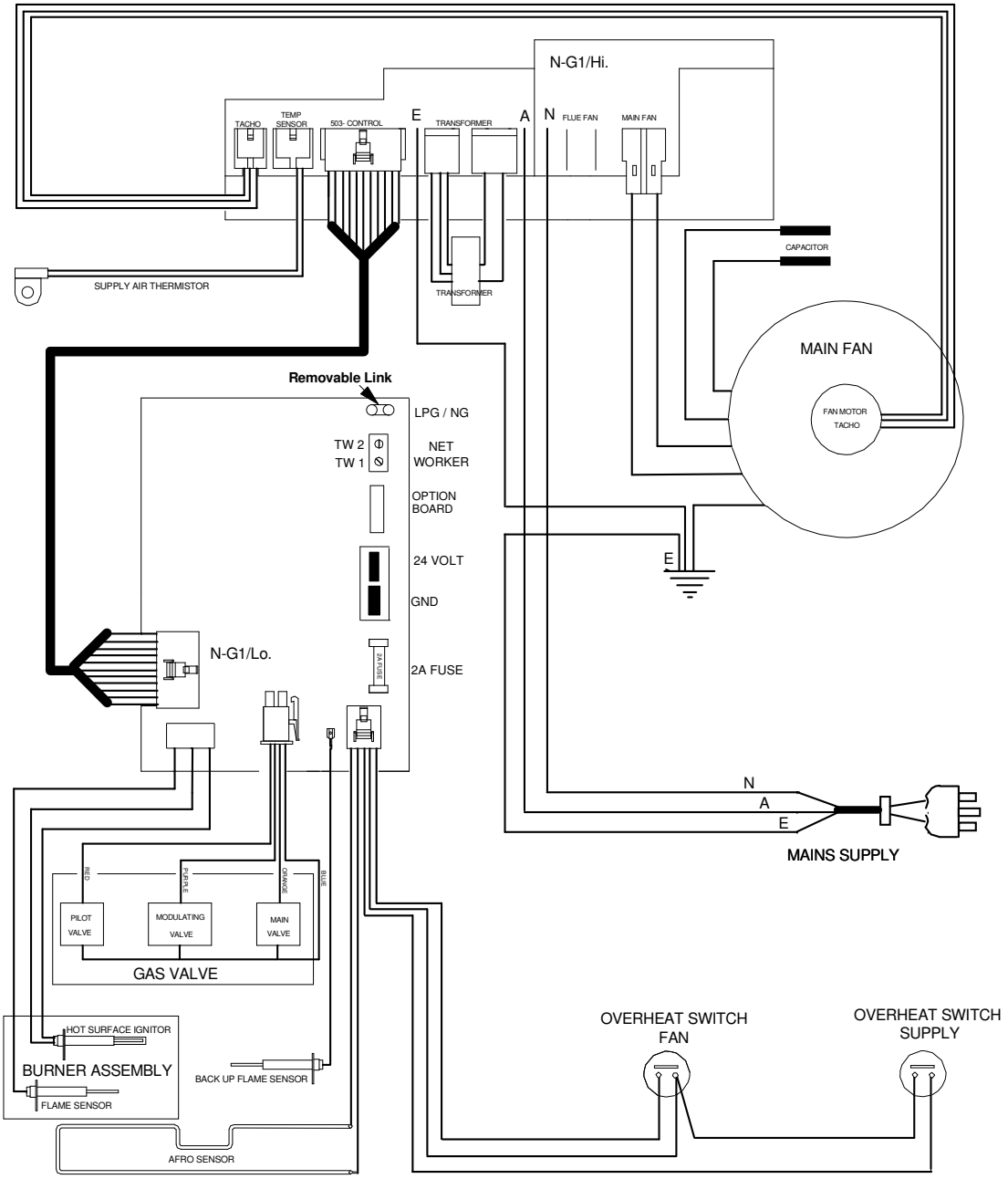
Brivis Multiplex Series



Technical Information

Wiring Diagram

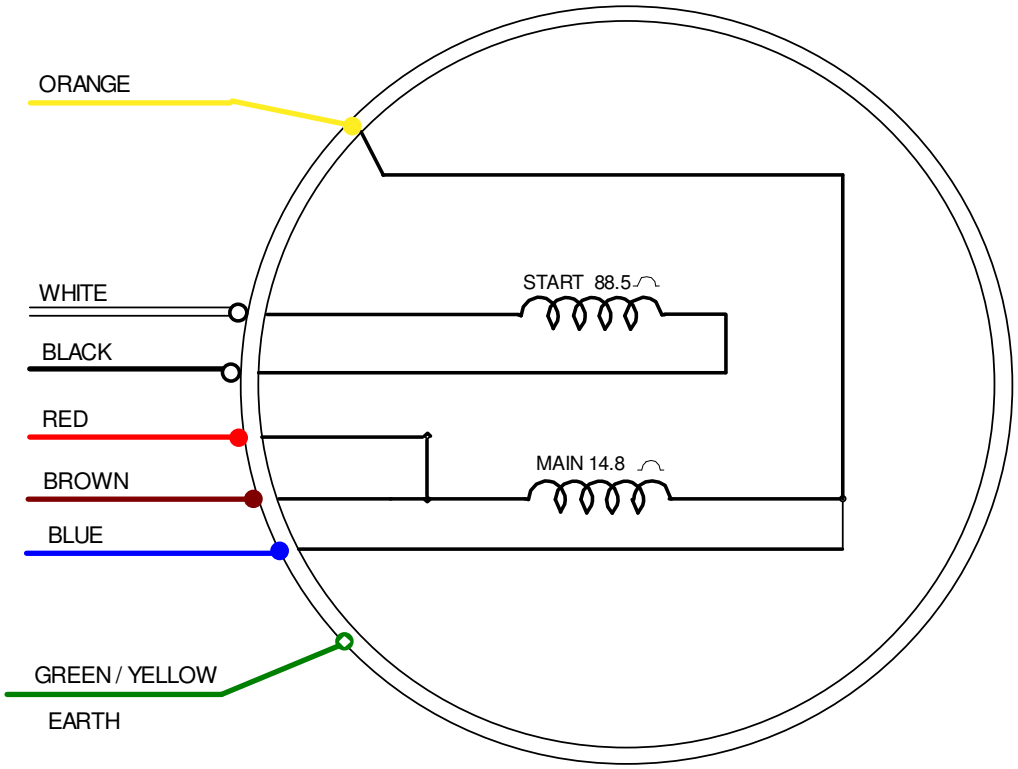
Brivis Auto-EMS Series



Technical Information

Motor Wiring Diagram (Current)

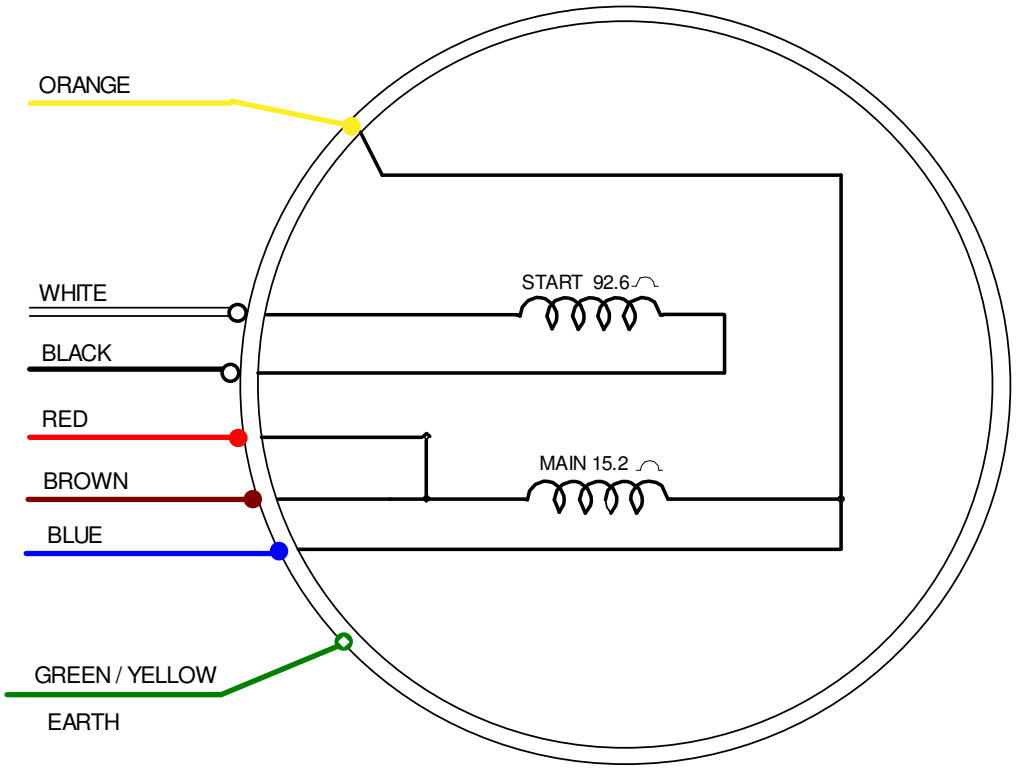
Fasco 250 WATT 808554MVA-A13
2.0 Amp
Capacitor 4uF



Technical Information

Motor Wiring Diagram (Superseded)

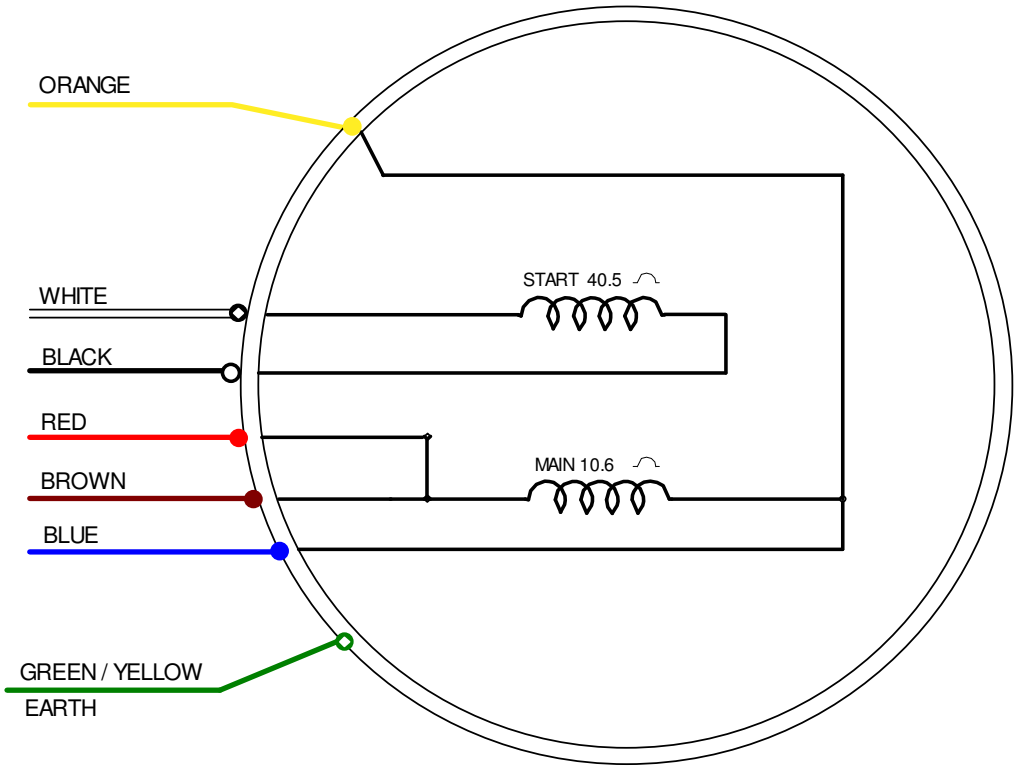
Fasco 250 WATT 8554MVA-A13
2.0 Amp
Capacitor 4uF



Technical Information

Motor Wiring Diagram (Current)

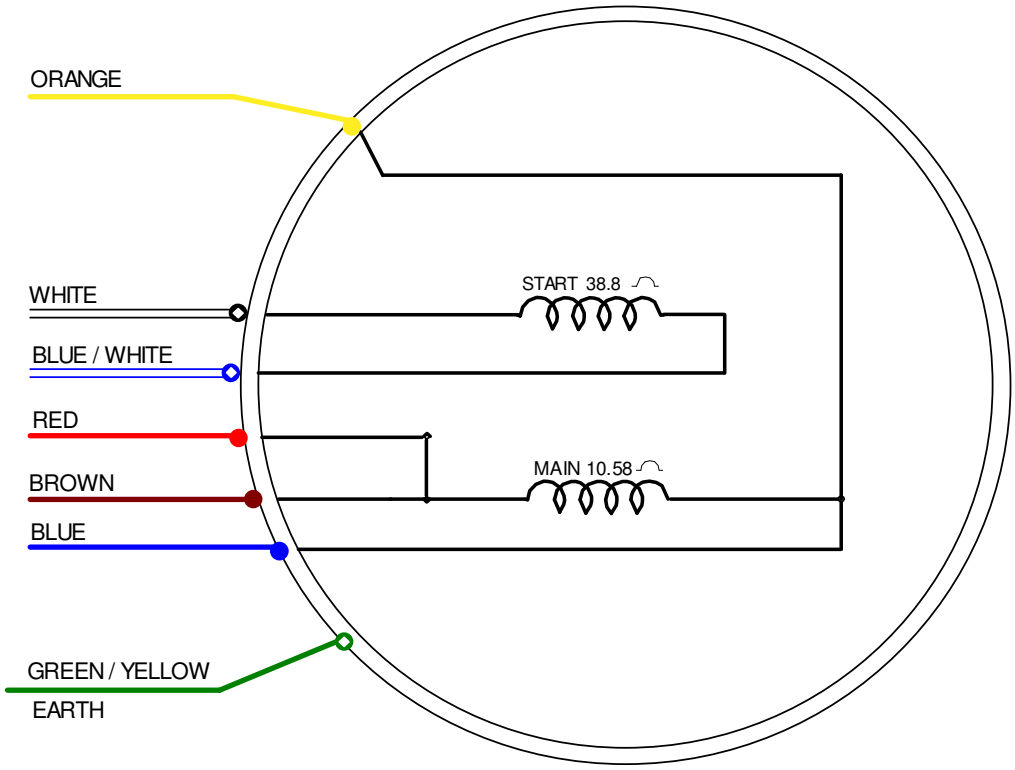
Fasco 315 WATT HUSH 80855BNVA-A20
4.2 Amp
Capacitor 15uF



Technical Information

Motor Wiring Diagram (Superseded)

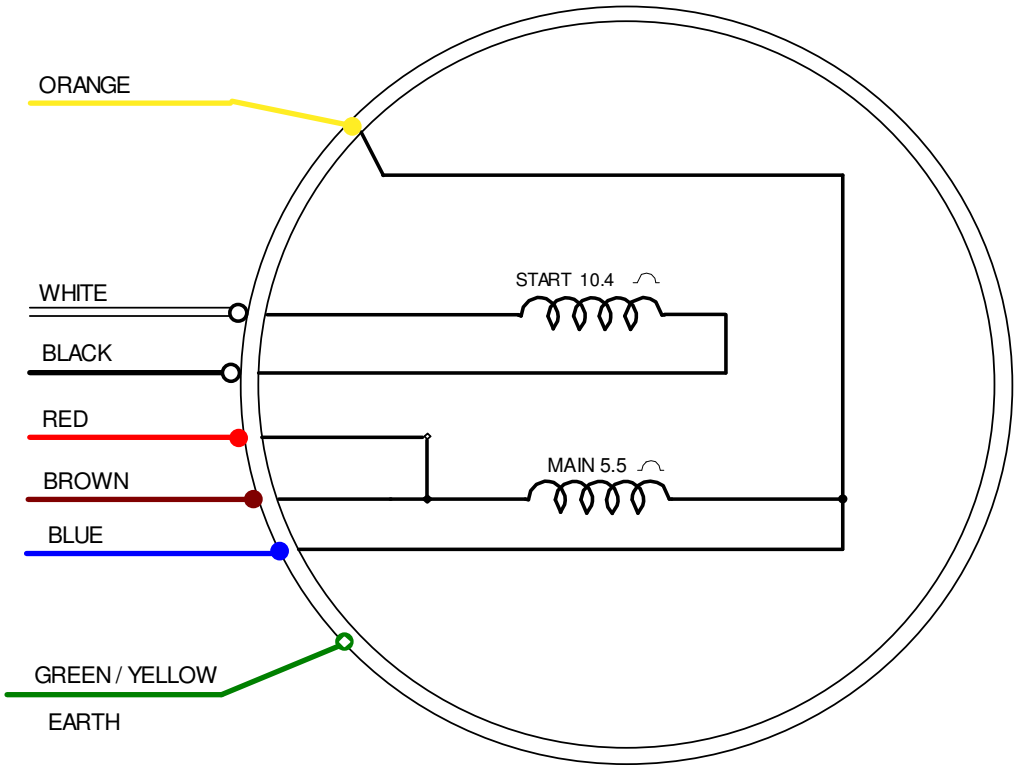
Fasco 315 WATT HUSH 8558BNVA-A13
4.2 AMP
Capacitor 15uF



Technical Information

Motor Wiring Diagram (Current)

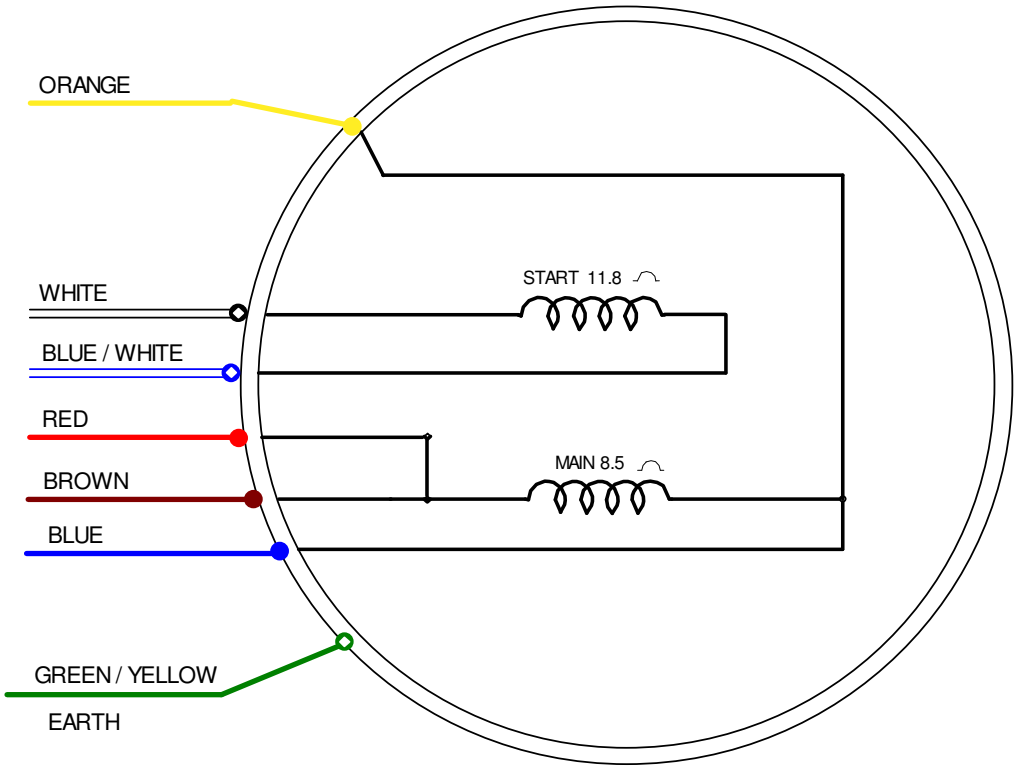
Fasco 500 WATT HUSH 80855BPVA-A13
3.0 AMP
Capacitor 15uF



Technical Information

Motor Wiring Diagram (Superseded)

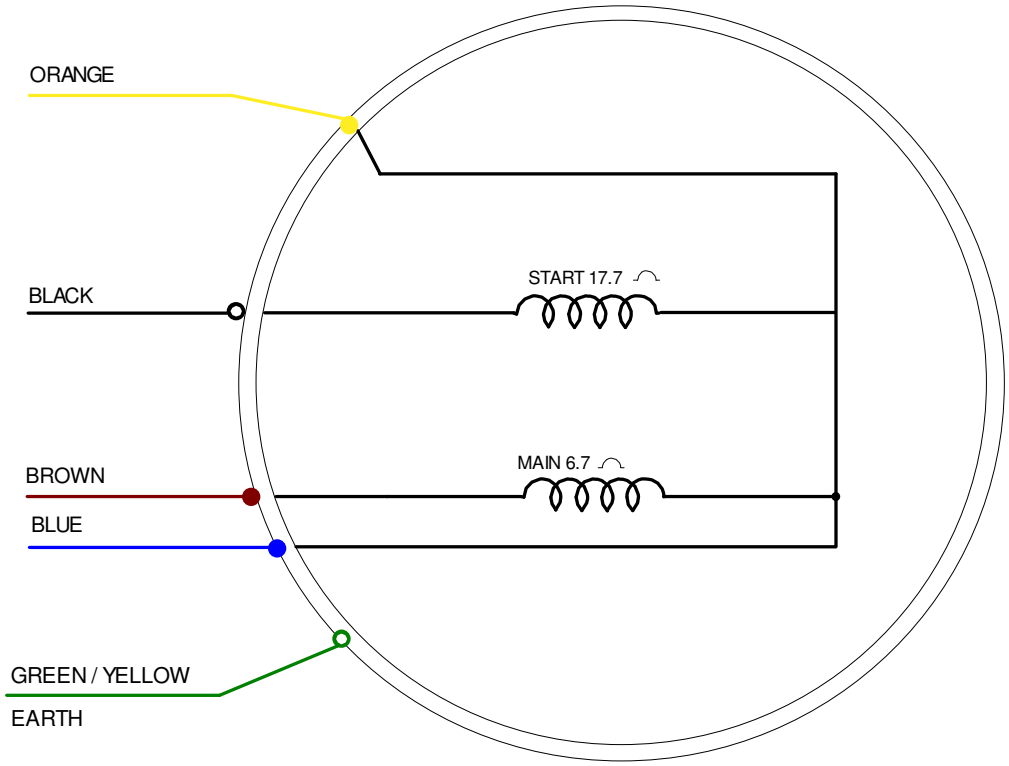
Fasco 500 WATT 8554PVA-A14
2.9 AMP
Capacitor 15uF



Technical Information

Motor Wiring Diagram (Current)

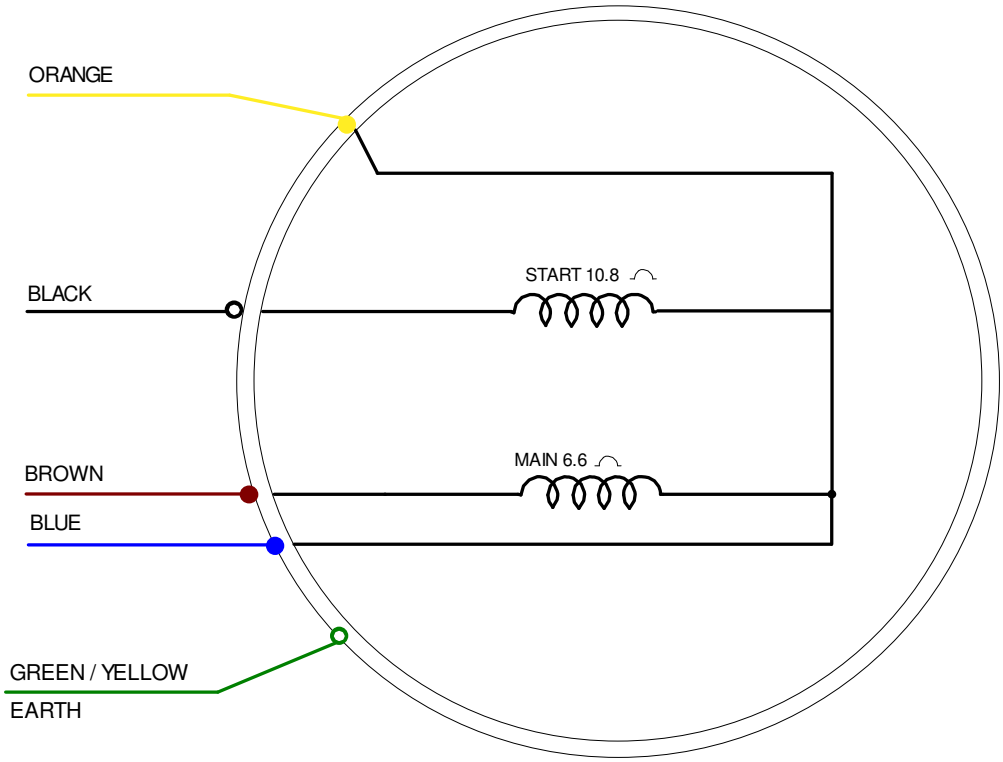
Fasco 650 WATT HUSH 80855BPVA-A12
4.3 Amp
Capacitor 25uF



Technical Information

Motor Wiring Diagram (Superseded)

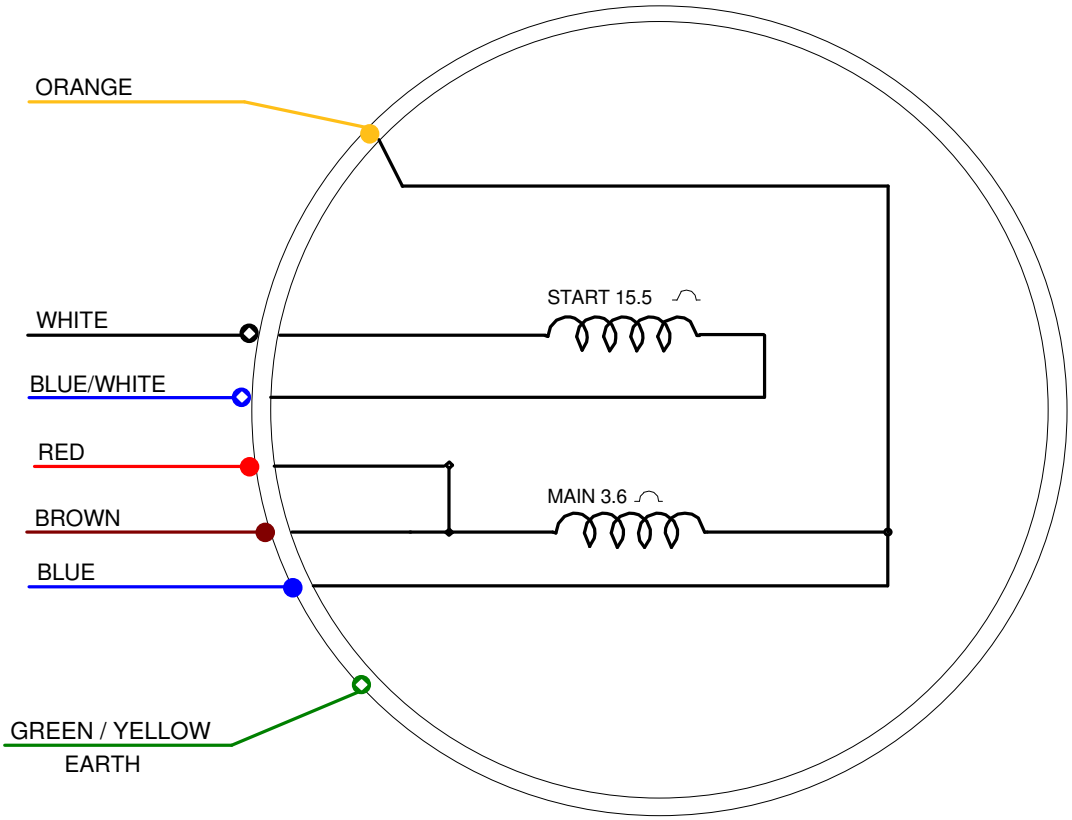
Fasco 650 WATT HUSH 855BPVA-A12
4.3 Amp
Capacitor 25uF



Technical Information

Motor Wiring Diagram (Superseded)

Fasco 750 WATT 8554QVA-A13
5.7 AMP
Capacitor 20uF

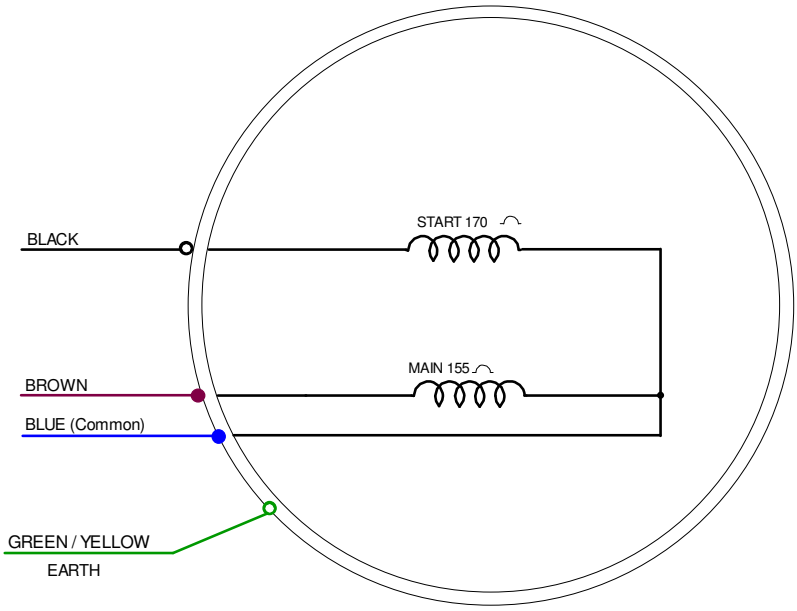


Technical Information

Combustion Fan Wiring Diagrams (Current)

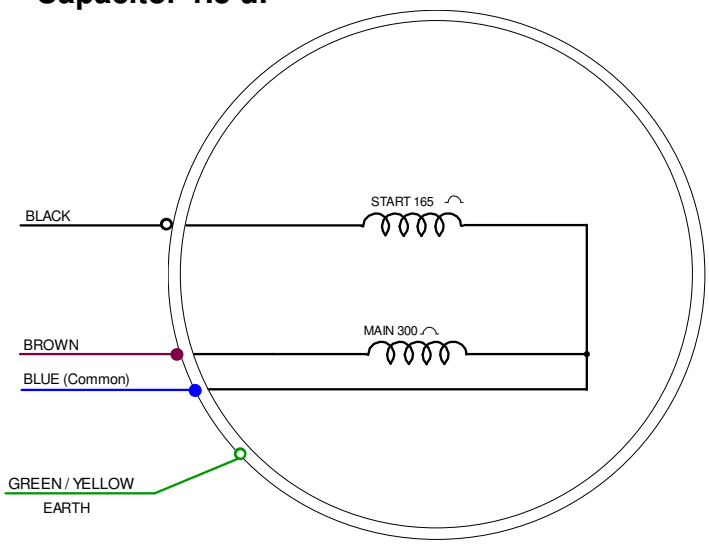
EBM 80 WATT R2E220-AA52-D4

0.34 AMP
Capacitor 2 uF



EBM 75 WATT R2E190-AE21-F2

0.32 AMP
Capacitor 1.5 uF

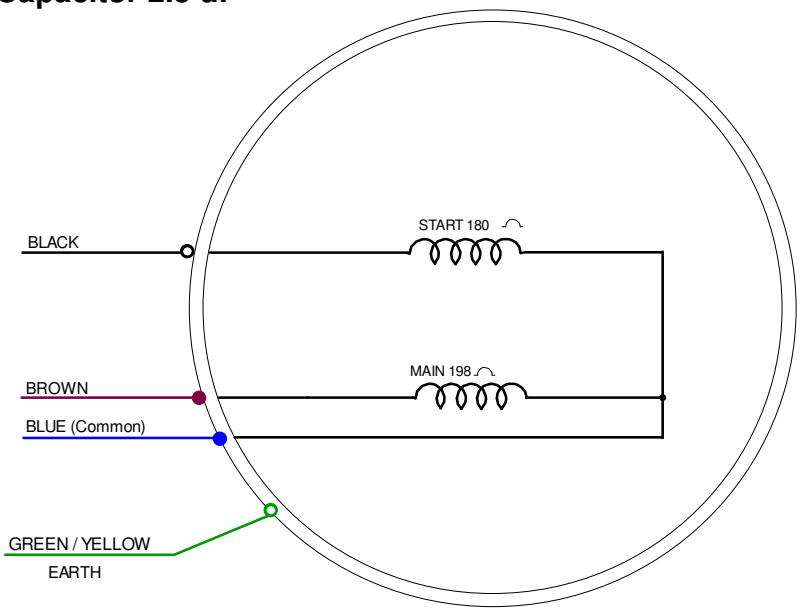


Technical Information

Combustion Fan Wiring Diagrams (Superseded)

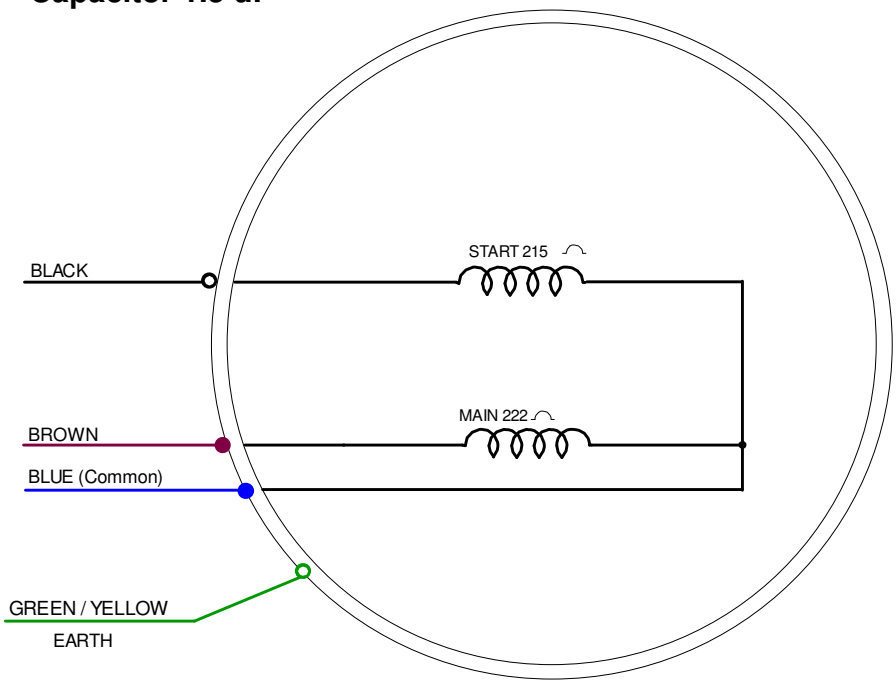
MES 100 WATT 220mm dia.

0.45 AMP
Capacitor 2.5 uF



MES 70 WATT 190mm dia.

0.3 AMP
Capacitor 1.5 uF



Technical Information

MPS HE Minimum and Maximum Flue Lengths

The flue connection to the HE unit is 50mm Drain Waste and Vent Pipe (DWV to AS/NZS 1260) and must be installed in accordance with the following.

The flue must discharge externally and be fitted with a Vent Cowl (DWV to AS/NZS 1260). The clearances as per the AG 601 installation code.

The **minimum pipe length is 1.2M** for 50mm DWV flue systems.

The maximum length of 50mm DWV flue pipe is dependant on the number of bends incorporated in the flue system as per the following table (maximum 4 bends).

Note: 45º bend = 1/2 X 90º bend.

Bends	0	0.5	1	1.5	2	2.5	3	3.5	4
Flue (M)	10	9.25	8.5	7.75	7	6.25	5.5	4.75	4

Alternatively, a 65mm DWV flue pipe system may be installed as follows:
The minimum pipe length for 65mm DWV flue systems is 4M.

The maximum pipe length for 65mm DWV flue systems is 20M and can include up to 6 bends.

Technical Information

MPS ME Internal (Remote Flue Kit) Installation Instructions

In some MPS ME Heater installations (e.g. under floor), a standard flue installation that terminates above the roof-line is not always practical or cost effective. This Remote Flue Kit has been designed so that the flue of an MPS ME Internal Heater can be terminated on an external wall, instead of running up the wall and being terminated above the roof with a 100mm round metal flue cowl.

The flue connection on the ME unit is suitable for 100mm dia. round single or twin wall non-corrosive metal flue and this flue must be installed in accordance with the following:

The flue must discharge externally and only be terminated using the Brivis terminal supplied in the MPS ME Internal Remote Flue Kit.

The flue terminal must be located to comply with the minimum clearances required for Fan-Assisted Flue Terminals as per the AG 601 Gas Installation Code.

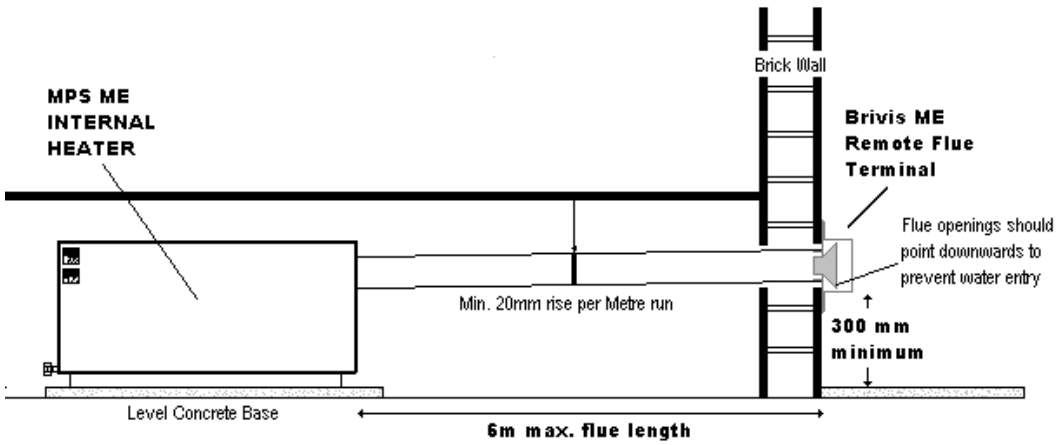
The flue must be installed in accordance with the gas regulations.

The maximum total length of 100mm round metal flue that can be installed between the Heater and the Flue Terminal is 6 metres.

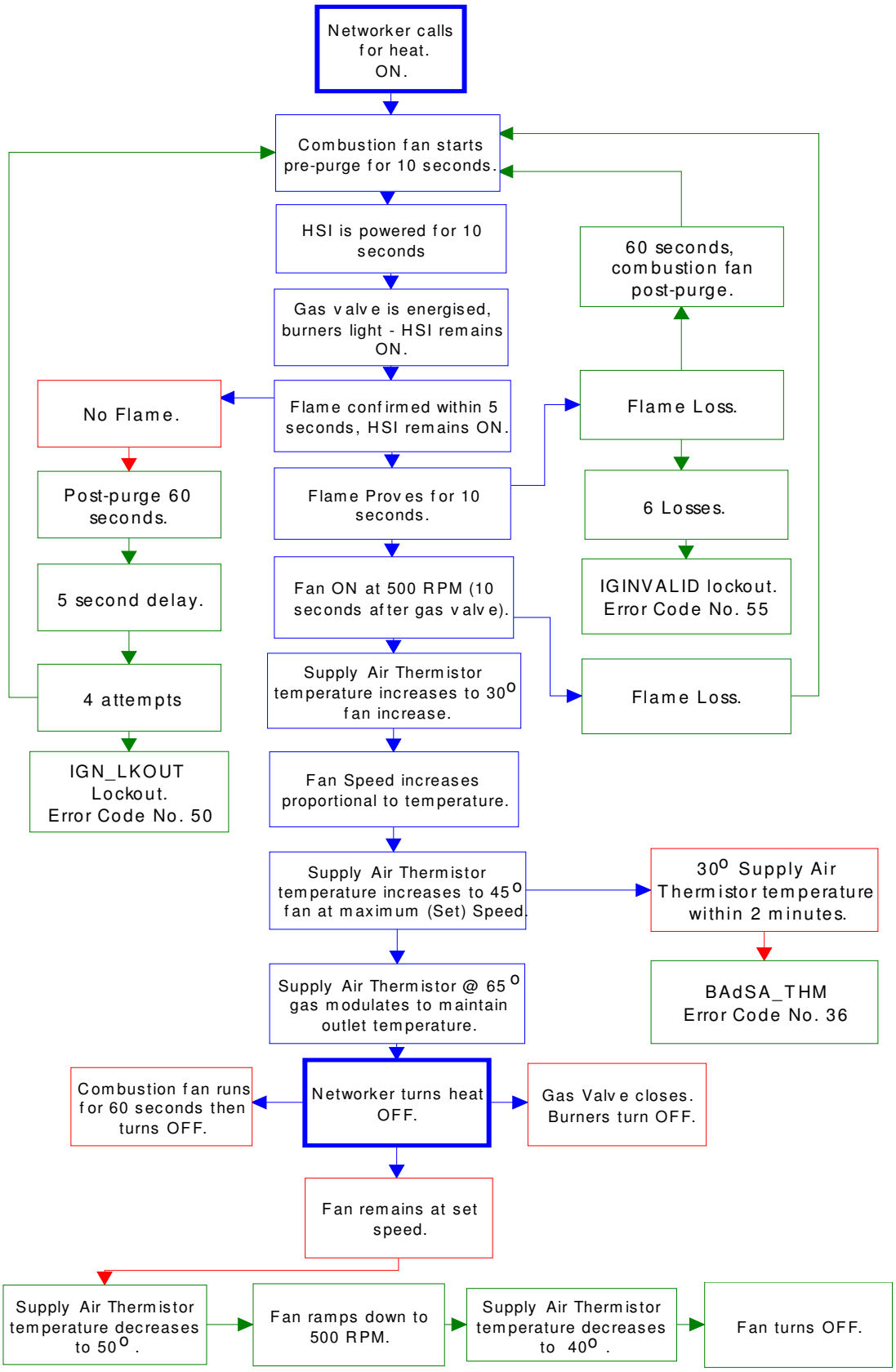
The flue system can also incorporate up to a maximum number of four (4) 90º bends if required.

Note: 45º bend = 0.5 x 90º bend.

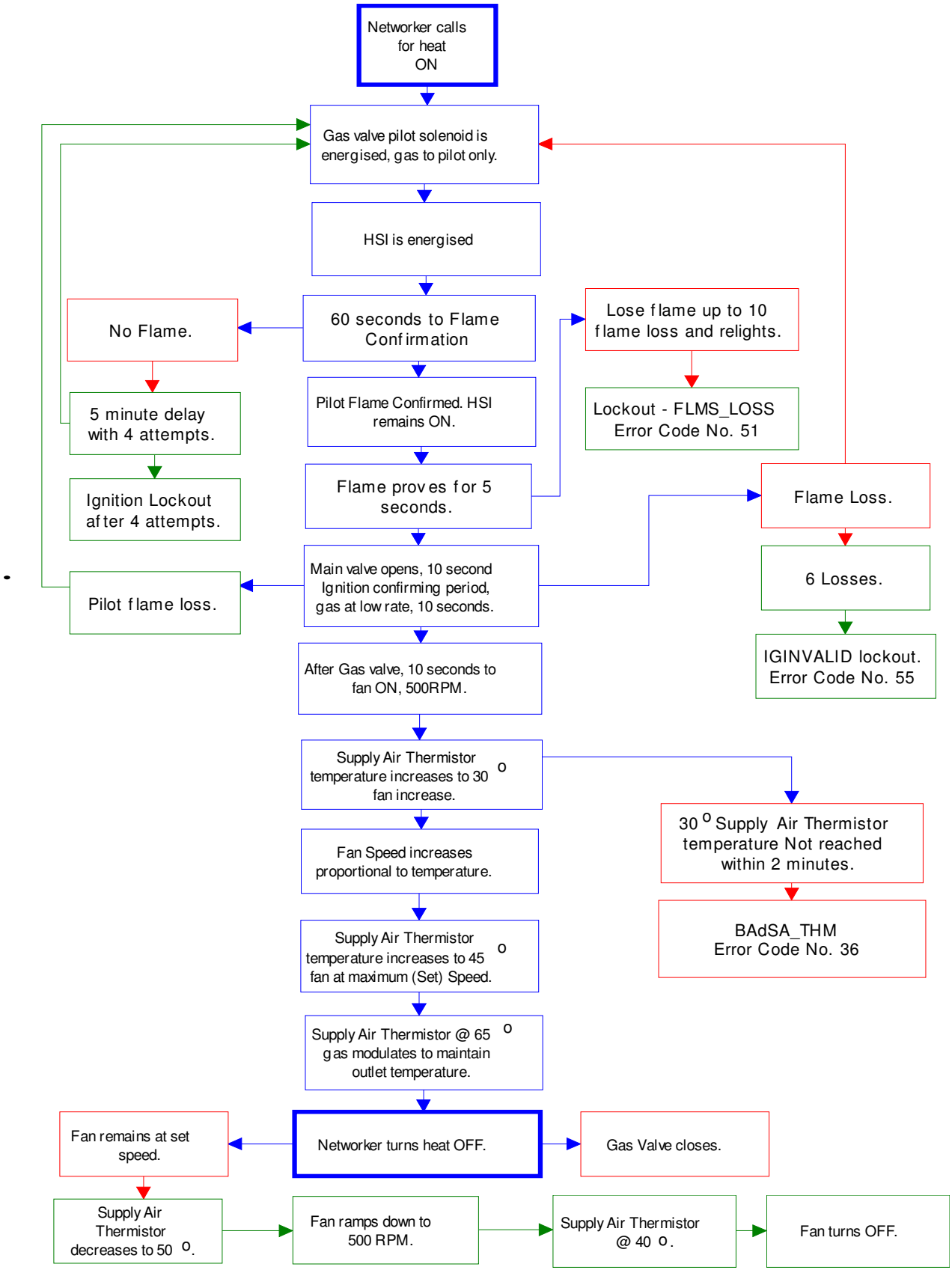
TYPICAL UNDERFLOOR INSTALLATION



Ignition & Heating Cycle Flowchart - MPS



Ignition & Heating Cycle Flowchart - Auto EMS

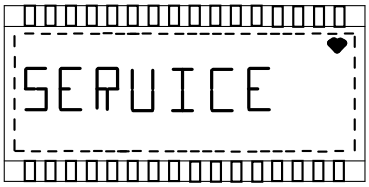


Using the N-G1/lo Service Parameters and Diagnostics

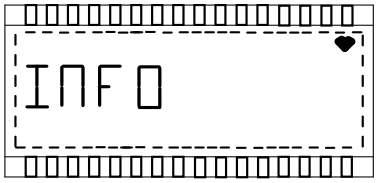
The new electronic controls in MPS and Auto EMS units provide the service technician a wide range of information about the heaters set-up and current operation status.

The "Service Mode" is also the provision for any service related heater parameters, operation error history information, and micro processor data checks to be accessed.

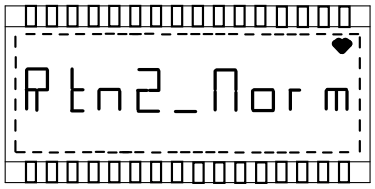
When the special key code is entered on the N-G1/lo buttons, the LCD momentarily shows:



then changes to the first of the Service Mode displays:

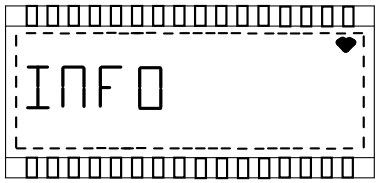


To exit the Service Mode at any point, press and hold the SET button until the LCD displays:

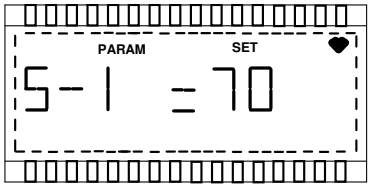


Using the N-G1/lo Service Parameters and Diagnostics (cont)

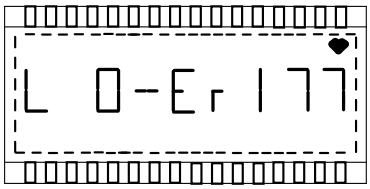
To move through the different service modes, press the SET button and the LCD will display the following:



INFO is the mode that provides current operation details. Use the UP & DOWN buttons to move through the Selection table.

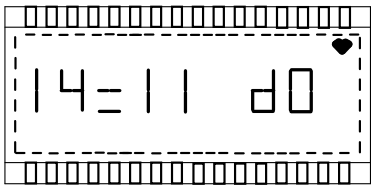


"S" mode is the service parameter access. The first service parameter number and value is Displayed. Use the UP & DOWN buttons to move Through the selection table.

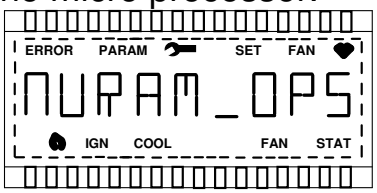


"L" mode is the EVENT LOG, with lockout and Malfunction operation history information. It displays the details between 2 alternating screens. Use the UP & DOWN buttons to move Through the log entries.

alternating with



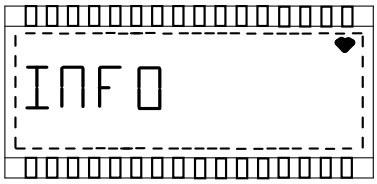
N-G/lo (pre version 7 models) included an additional mode for checking the status of the micro processor.



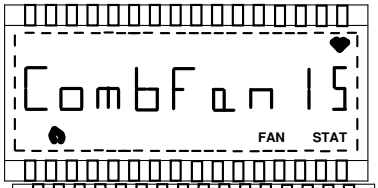
This section should be ignored, as it has no operational significance.

Using the N-G1/lo Service Parameters and Diagnostics (cont)

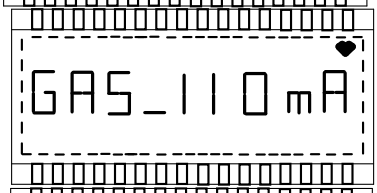
Information Mode



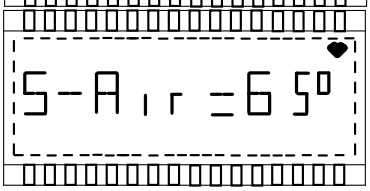
The information shown in this mode is the actual details from the sensors and components as they are operating, as distinct to how they have been set to operate. Use the DOWN (or UP) key to select through the following displays:



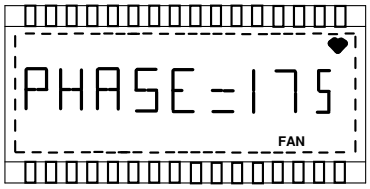
- CombFan 15 - displays the combustion fan's drive level
  (1-15 if running or "--" if not being driven).



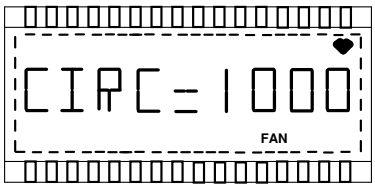
- GAS = 110 mA - displays the ACTUAL Current drive level to the gas valve solenoid.



- S -Air = 65^{o} - displays the ACTUAL measured temperature at the supply air thermistor in ^{0}C.



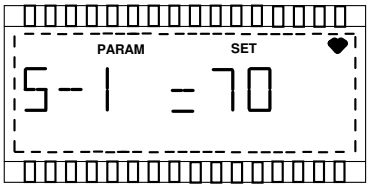
- PHASE = 175 - displays the current phase control to the main fan motor.



- CIRC = 1000 - displays the ACTUAL main fan RPM

Using the N-G1/lo Service Parameters and Diagnostics (cont)

Service Parameters Mode



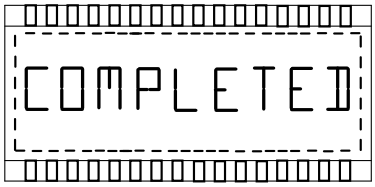
In Service Parameter mode the parameter number is displayed immediately following the "S" to the Left of the LCD.

The value of the parameter setting is to the Right of the LCD, and can be adjusted by using the UP & DOWN buttons whilst the SET button is pressed.

The changed parameter value is automatically saved when the following parameter is selected. **Ensure you have moved at least one parameter beyond the parameter modified, otherwise the changes will not be saved.**
The **installer parameters** and **service parameters** can be reset to the factory default settings by pressing the UP and DOWN keys simultaneously in service parameter mode.

During this process the LCD will display:

followed by:



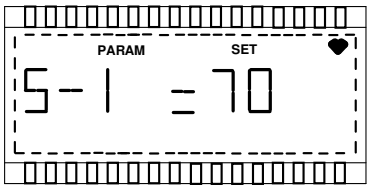
When the operation is finished, again the display will remain at COMPLETED until another button (any) is pressed.

Alternatively, the LCD on N-G1/lo modules with newer software versions will display:

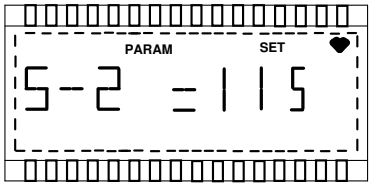
And then automatically return to the normal Operation display when the operation is finished.
NOTE: The N-G1/lo will automatically exit from service mode after 30 minutes and resets the N-G1/lo control. This is to avoid the unit accidentally being left in the service parameter mode. Care should be taken when working in service mode for extended periods, as the N-G1/lo will perform a power up reset without warning after 30 minutes.

Using the N-G1/lo Service Parameters and Diagnostics (cont)

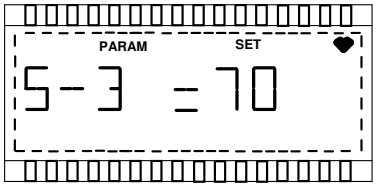
Service Parameters Mode (cont)



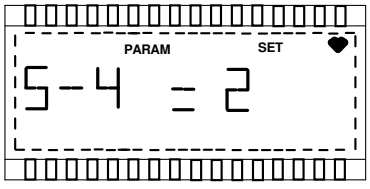
- Auto EMS Natural Gas Minimum Rate. Default = 70
  This is the minimum mAmp setting of the current to the Auto EMS gas valve modulating solenoid to determine the minimum Natural Gas flow.
  Parameter setting range: 50 - 160



- Auto EMS Natural Gas Maximum Rate. Default = 115
  This is the maximum mAmp setting of the current to the Auto EMS gas valve modulating solenoid, to determine the maximum Natural Gas flow.
  Parameter setting range: 100 - 160



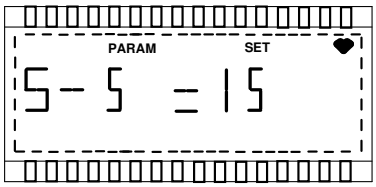
- Auto EMS Natural Gas Start Rate.
  Default = 70
  This is the mAmp setting of the current to the Auto EMS gas valve modulating solenoid, to determine the Natural Gas flow on burner start-up.
  Parameter setting range: 50 - 100



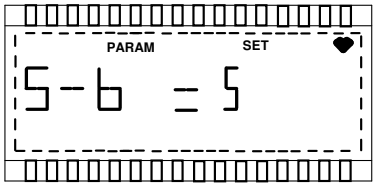
- MPS Combustion Fan Minimum Drive Level.
  Default = 2
  This is the minimum power drive level supplied to the combustion fan that will determine the minimum Natural Gas flow from the gas valve.
  Parameter setting range: 1 - 15

Using the N-G1/lo Service Parameters and Diagnostics (cont)

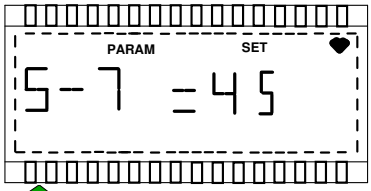
Service Parameters Mode (cont)



- MPS Combustion Fan Maximum Drive Level.
  Default = 15
  This is the maximum power drive level supplied to the combustion fan that will determine the maximum Natural Gas flow from the gas valve.
  Parameter setting range: 1 - 15



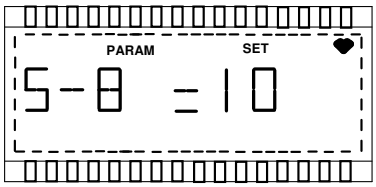
- MPS Combustion Fan Start Drive Level.
  Default = 5
  This is the power drive level supplied to the combustion fan that will determine the starting Natural Gas flow from the gas valve.
  Parameter setting range: 1 - 15



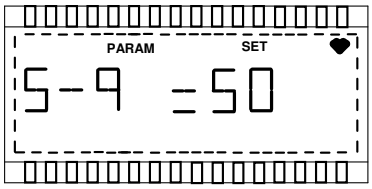
- Heat up Outlet Cut Off Temperature.
  Default = 45
  This is the temperature at the supply air thermistor that the fan reaches full set speed and the operation changes to steady state mode.
  Parameter setting range: 40 - 55.

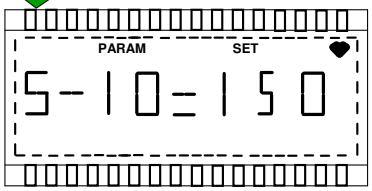
Using the N-G1/Io Service Parameters and Diagnostics (cont)

Service Parameters Mode (cont)



- Fan Cool Down Speed Gradient.
  Default = 10
  This parameter value determines the rate the fan slows in the cool down cycle between the steady state speed of the fan and the 500 RPM OFF speed.
  The rate is calculated by dividing 6000 by the parameter value. i.e. 6000/10=600 RPM.
  If the fan is set at 1000 RPM - 500 RPM (OFF speed) = 500 RPM, the time rate will be 0.83 minutes (50 sec.).
  Parameter setting range: 5 - 20.



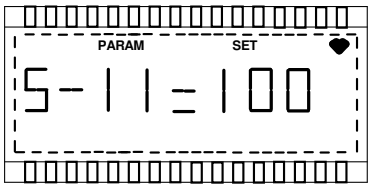


- Cool Down Outlet Cut Off Temperature.
  Default = 50
  This is the temperature at the supply air thermistor that the fan commences the Cool Down Speed Gradient, until it reaches 500 RPM.
  Parameter setting range: 40 - 55.

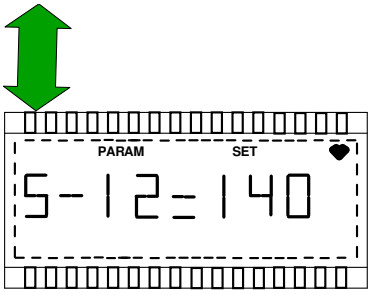
- DO NOT ALTER
  Default = 150
  Parameter setting range: 30 - 150.

Using the N-G1/Io Service Parameters and Diagnostics (cont)

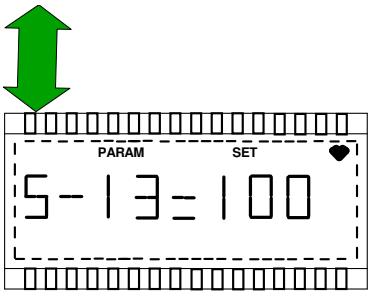
Service Parameters Mode (cont)



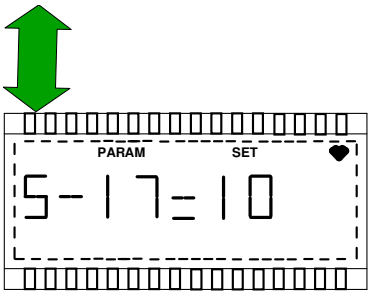
- Auto EMS LP Gas Minimum Rate.
  Default = 100
  This is the minimum mAmp setting of the current to the Auto EMS gas valve modulating solenoid to determine the minimum LP Gas flow.
  Parameter setting range: 50 - 160



- Auto EMS LP Gas Maximum Rate.
  Default = 140
  This is the maximum mAmp setting of the current to the Auto EMS gas valve modulating solenoid, to determine the maximum LP Gas flow.
  Parameter setting range: 100 - 160



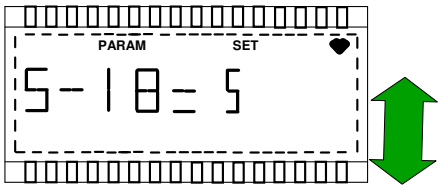
- Auto EMS LP Gas Start Rate. Default = 100
  This is the mAmp setting of the current to the Auto EMS gas valve modulating solenoid, to determine the LP Gas flow on burner start up.
  Parameter setting range: 50 - 100



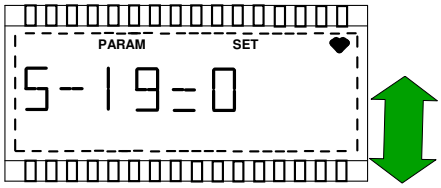
- MPS Combustion Fan Intermediate Drive Level.
  Default = 10
  This is the intermediate power level supply to the combustion fan in the ignition operation between the start drive level and the maximum drive level.
  Parameter setting range: 1 - 15

Using the N-G1/Io Service Parameters and Diagnostics (cont)

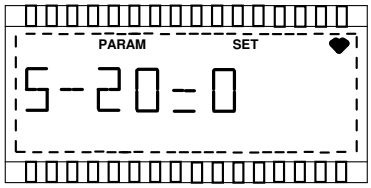
Service Parameters Mode (cont)



- DO NOT ALTER
  Default = 5
  Parameter setting range: 0 - 20.



- DO NOT ALTER
  Default = 0
  Parameter setting range: 0 - 20.



- DO NOT ALTER
  Default = 0
  Parameter setting range: 0 - 40.

Using the N-G1/lo Service Parameters and Diagnostics (cont)

Event Log information access

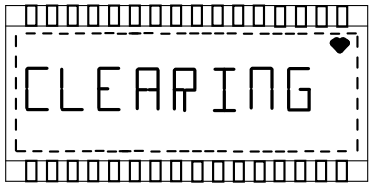
The event log diagnostics provide the service technician with an accurate history of any lockout occurrence.

This log has 32 event log entries that will be entered automatically as lockout errors occur, starting at 0 and ending at 31.
The most recent error entry will be the lowest log entry used and any prior entries will be moved back.

NOTE: If the N-G1/lo has been reset following any error entries they will remain in sequential order, but may have moved to any starting point within the log register. Therefore, it may be necessary to check all 32 log entries.

The event log can be cleared and reset by the service technician, by pressing and holding the UP and DOWN buttons simultaneously, whilst in the Event Log Mode (post version 7 only).

The LCD will then display the following when clearing the log.



It is recommended that the service technicians adopt the following field servicing procedure:

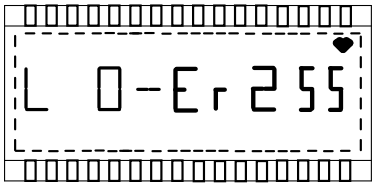
- When servicing a MPS or Auto EMS the event log must be checked.
- The first three most recent errors listed in the event log, need to be recorded on the service call sheet. Record the error numbers in the same order as the log i.e. 0 - 32, where 0 = most recent.
- When the malfunction is diagnosed and rectified, the event log should be cleared and reset to zero (where possible).

Using the N-G1/lo Service Parameters and Diagnostics (cont)

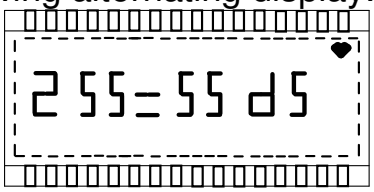
Event Log information access (cont)

The information is provided with 2 alternating screens displaying firstly, the log entry number, together with the error code number, then the second screen displays the time and day information.

An unused log entry will have the error default value of 255 as shown in the display that follows:



Together with the following alternating display:



Note:

If an attempt to reset the N-G1/lo without a power up, the event log may have an entry logged with "zeros" displayed. The log entry prior to these will indicate the error the unit locked out on.

Using the N-G1/lo Service Parameters and Diagnostics (cont)

Event Log information access (cont)

When any lockout error is recorded in the event log, the first screen will display each entry in order with the error code number. The second screen display then gives the time and day details as follows:

The first 2 digits on the left of screen, give the hour the event occurred (24 hour clock display) i.e. See example below.

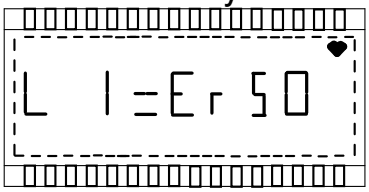
The 2 digits in the centre of the screen give the minute of the hour the event occurred.

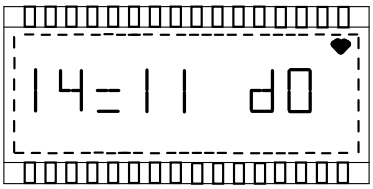
The "d" and the digit to the right of screen gives the DAY the event occurred starting with Monday = 0, Tuesday = 1, Wednesday = 2, Thursday = 3, Friday = 4, Saturday = 5, Sunday = 6.

To move through the log entries, press the UP & DOWN keys.

The following is an example of N-G1/lo with the **second** entry in the event log, for an error of:

IGN_LKOUT @ 2:11 PM on Monday





Refer to the error code section for details of code numbers.

N-G1/o (pre version 7 models) only recorded "Lockouts" in the event log are as follows:

Err 50 - IGN_LKOUT	Err 56 - PowER_UPD	Err 65 - MTR_LKOUT
Err 51 - FLMS_LOSS	Err 60 - MOTOR_O-C	Err 67 - 503_WD
Err 52 - FLM_NOGAS	Err 61 - 503_FAIL1	Err 69 - FUSE_BLOW
Err 53 - OH_LKOUT	Err 62 - HSI_LOCK	Err 70 - FSAFE_LOC
Err 54 – RoLLKOUT	Err 63 - 503_FAIL5	Err 71 - FSaFE_LOC
Err 55 – IGNINVALID	Err 64 - 503_FAIL	

N-G1/lo Error Codes

The heaters control system has been structured into 7 levels for the various types of malfunction that may occur, in the operation of the MPS and Auto EMS units.

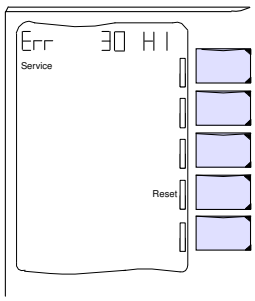
The error is displayed as shown in the diagram below, and may provide useful information to service staff.

The Networker will be signaled that a malfunction has occurred, and also display the heater/s error associated with it.
If there is more than one operational error, then the Networker will scroll through each in order of priority, and display them all.

The heater's identity is displayed to the right of screen,
i.e. H 1 = Heater No.1, and the fault Error code number is displayed in the centre screen.

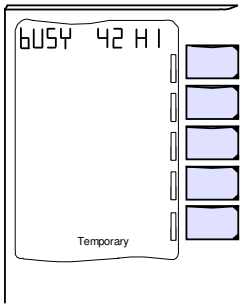
Some error screens also provide a RESET function to either:

- Restart the unit.
- Turn OFF the audible "beep"** the Networker sounds to alert the user there is a problem.



*** "Beep" alert only occurs on the older style N-C1 Networkers and was discontinued when the new style N-C2 was introduced.*

Screens that display "BUSY" and "TEMPORARY" indicate, the unit has a temporary operation malfunction, and will reset itself automatically once the condition has cleared.

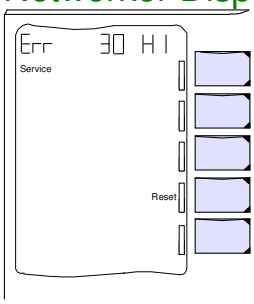


The following pages describe each error code number, reset availability and description of the unit's operation status and service checks.
The first used error number is 30, reserving the previous numbers for future development.

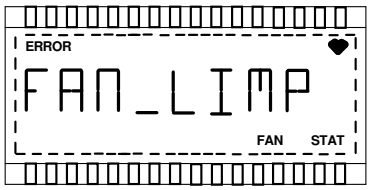
N-G1/lo Error Codes (cont)

Error Code 30

Networker Display



N-G1/lo Display



The Networker:

This screen alternates with the normal heating operation display.
The Networker may "beep" to alert the user of the problem.
A Reset button will appear to turn off the beeping sound.

The N-G1/lo:

The heater still operates with this error present, though if the operation does not give the maximum or best performance.

FAN_LIMP means the N-G1/lo has not received the fan motor speed sensor signal required for normal operation.

In FAN_LIMP the heater reverts to timing the ON and OFF fan operation with the fan speed at maximum.

The fan ON time = 45 seconds from when the gas valve is energised at the start of the heating cycle.

The fan OFF time = 60 seconds from when the gas valve closes at the end of the heating cycle.

The fan will not vary speed, as the N-G1/lo has no fan RPM signal.

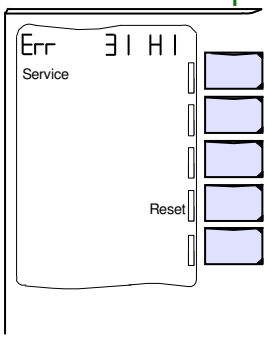
Service Check List:

- **Check the N-G1/lo to N-G1/hi Interconnection loom and perform Earth Test (as per Page 121).**
- **Perform Fan Speed Sensor Test (as per Page 121).**
- Check for a loose fan impellor on the motor shaft.
- Replace fan speed sensor
- Replace Lo to Hi Module interconnecting loom.
- Check and or replace the N-G1/hi module and retest.
- If all this fails replace N-G1/lo module and retest.

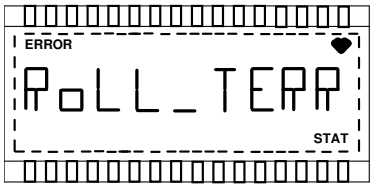
N-G1/lo Error Codes (cont)

Error Code 31

Networker Display



N-G1/lo Display



The Networker:

This screen alternates with the normal heating operation display.
The Networker may "beep" to alert the user of the problem.
A Reset button will appear to turn off the beeping sound. However, the beep will return for each cycle start-up.

The N-G1/lo:

The heater can operate with this error present.

This function was not operative until 1/11/1998

When the Networker turns OFF the call for heat in a normal heating cycle, the gas valve closes, and N-G1/lo module carries out a test (8 seconds) on the function of the AFRO sensor and circuit.

If the AFRO sensor is **open circuit or shorted to Earth**, then the unit will indicate this error.

Service Check List:

- Check that the AFRO sensing rod is fitted with grey silicone grommets (not black), replace if necessary.
- Check that the AFRO sensing rod is correctly mounted in the bracket - insulated and not touching Earth (bracket metal or cabinet).
- Check the wire loom and wire connections at both ends for open circuit.
- Check if 2 Amp fuse is blown.

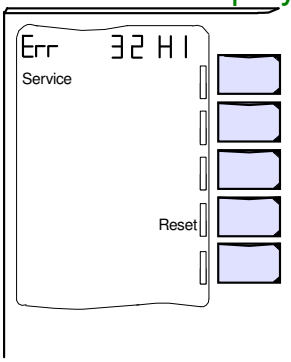
If the condition is still present following the above checks:

- Replace N-G1/lo module and retest.

N-G1/lo Error Codes (cont)

Error Code 32

Networker Display



N-G1/lo Display

The Networker:

This screen alternates with the normal heating operation display.
The Networker may "beep" to alert the user of the problem.
A Reset button will appear to turn off the beeping sound.

The N-G1/lo:

The heater may still operate with this error present.

The unit may be used until a service technician attends.

The N-G1/lo has failed to load data on power up, and has reverted to the Default settings.

Service Check List:

- Reset the N-G1/lo module and check the installer parameters.

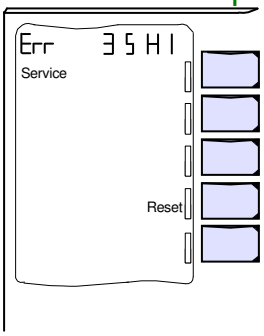
If the error is still present or reoccurs

- Replace N-G1/lo module.

N-G1/lo Error Codes (cont)

Error Code 35

Networker Display



N-G1/lo Display

The Networker:

This screen alternates with the normal heating operation display.
The Networker may "beep" to alert the user of the problem.
A Reset button will appear to turn off the beeping sound.

The N-G1/lo:

The heater still operates with this error present, though the operation does not give the maximum or best performance.

No_S-A_THM means the thermistor circuit is open circuit, and the N-G1/lo has not received the supply air thermistor sensor signal.

The fan will be timed ON and OFF, operated at the installer set RPM, and the gas valve will be force to the minimum rate.

The fan ON time = 45 seconds from when the gas valve is energised at the start of the heating cycle.

The fan OFF time = 60 seconds from when the gas valve closes at the end of the heating cycle.

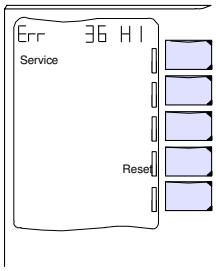
Service Check List:

- Check the supply air thermistor has been installed, and that the loom and/or plug has been connected to the thermistor.
- Check the supply air thermistor wire loom has not been damaged.
- **Check the N-G1/lo to N-G1/hi Interconnection loom and perform Earth Test (as per Page 121).**
    - Check the thermistor is not faulty, check for 10 kOHM @ 20^{O}C. Resistance.

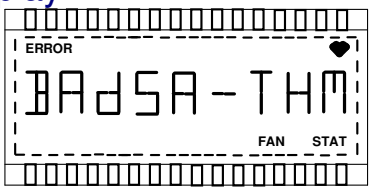
N-G1/lo Error Codes (cont)

Error Code 36

Networker Display



N-G1/lo Display



The Networker:

This screen alternates with the normal heating operation display.
The Networker may "beep" to alert the user of the problem.
A Reset button will appear to turn off the beeping sound.

The N-G1/lo:

BAdSA_THM means, the supply air thermistor has a circuit, but has not reached 30ºC. within 2 minutes of the fan operation commencing, in a normal heating cycle.

The user still has some heating, until the problem can be rectified by a service technician, though the operation does not give the maximum or best performance.

In BAdSA_THM fan operation, the unit cannot rely on the thermistor signal, and therefore operates the heater as follows:

Fan operates at installer set speed, and the gas valve operates at minimum rate.

The fan ON time = 45 seconds from when the gas valve is energised at the start of the heating cycle.

The fan OFF time = 60 seconds from when the gas valve closes at the end of the heating cycle.

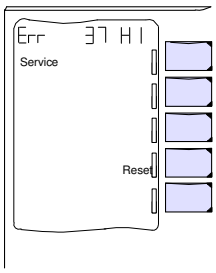
Service Check List:

- Check the Supply Air Thermistor is installed in the Supply Air duct (MPS models).
- Check the Supply Air Thermistor is not faulty, check for 10 kOHM @ 20ºC. resistance.
- Check the Supply Air Thermistor is not located in an unsuitable position within the Supply Air duct.

N-G1/lo Error Codes (cont)

Error Code 37

Networker Display



N-G1/lo Display

The Networker:

This screen alternates with the normal heating operation display.
The Networker may "beep" to alert the user of the problem.
A Reset button will appear to turn off the beeping sound.

The N-G1/lo:

The heater still operates with this error present.

TACHO_Err means the N-G1/lo has no fan RPM signal (unplugged), or a signal of excessive range (greater than 1500 RPM).

The user still has some heating, until the problem can be rectified by a service technician, though the operation does not give the maximum or best performance.

In TACHO_Err the heater reverts to timing the ON and OFF fan operation with the fan speed at maximum.

The fan ON time = 45 seconds from when the gas valve is energised at the start of the heating cycle.

The fan OFF time = 60 seconds from when the gas valve closes at the end of the heating cycle.

The fan will not vary speed, as the N-G1/lo has no or an incorrect fan RPM signal.

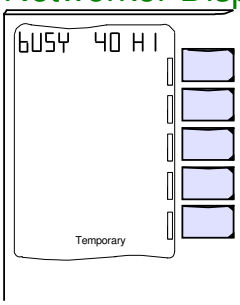
Service Check List:

- **Check the N-G1/lo to N-G1/hi Interconnection loom and perform Earth Test (as per Page 121).**
- **Perform Fan Speed Sensor Test (as per Page 121).**
- Check for a loose fan impellor on the motor shaft.
- Check the fan motor operation for irregular RPM, and/or for jerking or pulsing operation.
- Replace fan speed sensor
- Replace Lo to Hi Module interconnecting loom.
- Check and or replace the N-G1/hi module and retest.

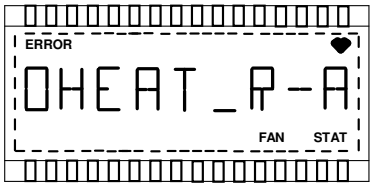
N-G1/lo Error Codes (cont)

Error Code 40

Networker Display

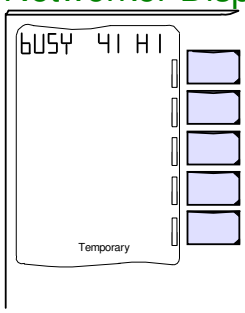


N-G1/lo Display

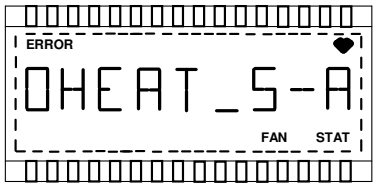


Error Code 41

Networker Display

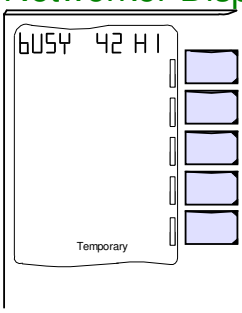


N-G1/lo Display



Error Code 42

Networker Display



N-G1/lo Display

The Networker:

These Errors are only a temporary operation malfunction, that will disappear when the condition is rectified, or the heater resets.

The N-G1/lo:

These errors will appear whilst an over temperature is current, the Klixon circuit is open, or the thermistor circuit is shorted.
The heater's fan will be forced to operate at maximum speed.

N-G1/lo Error Codes (cont)

Error Code 40, 41, & 42

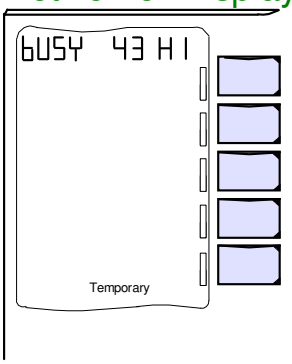
Service Check List:

- Check the temperature registered at the nearest outlet to the heater, and compare this to the supply air thermistor temperature displayed on the N-G1/lo module.
- Check the temperature rise value of the supply air thermistor and nearest outlet temperature, over the room temperature (Return Air intake temperature). A 47^0C. Temperature rise will indicate a true overheat condition.
- Check there are sufficient outlets open on the duct system.
- Check the return air filter (if fitted) is sized correctly and is clean.
- Check that the fan speed is sufficient for the system so that over heating will not result.
- Check the fan motor is functioning correctly, and is not blocked or obstructed.
- Check the ducting has not been crushed, damaged or incorrectly sized.
- Check the gas valve's pilot solenoid is not jammed open and passing gas when not energised (EMS only).
- Check the return air intake is not subjected to a high temperature from an external source.
- Check that the supply air thermistor is correctly fitted in the supply air duct.
- Check the wire loom and plug connections to the switch are not open circuit, i.e. wire fallen off switch.
- Check the supply air thermistor circuit is not shorted together or Earthed.
- Check the Supply Air Thermistor is not faulty, check for 10 kOHM @ 20ºC. Resistance.
- Check the link circuit on the N-G1/lo module between terminals 24 V. and STAT is open circuit (pre version 7 models only).

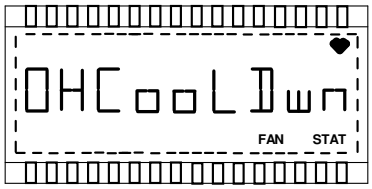
N-G1/lo Error Codes (cont)

Error Code 43

Networker Display



N-G1/lo Display



The Networker:

This Error is only a temporary operation malfunction, that will disappear when the condition is rectified, or the heater resets.

The N-G1/lo:

This error will be displayed during the 60 second maximum fan operation following an over temperature switch reset.

Service Check List:

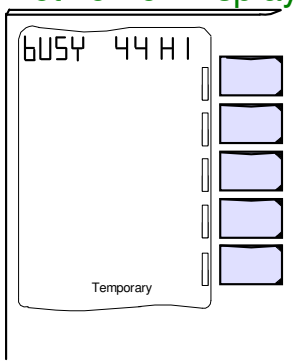
- Check for another error code display during the next heating cycle, then refer to the check list for the relevant over temperature condition.

  i.e. Error Code: 40 OHEAT_R-A,
  Error Code: 41 OHEAT_S-A,
  Error Code: 42 OHEAT_THM.

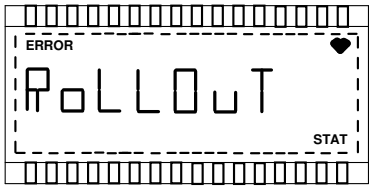
N-G1/lo Error Codes (cont)

Error Code 44

Networker Display



N-G1/lo Display



The Networker:
This Error is only a temporary operation malfunction, that will disappear when the condition is rectified, or the heater resets.

The N-G1/lo:
This error display will only be seen while the heater is currently recovering from conditions of flame sensed on the AFRO sensing rod indicating a flame roll out. This is the 10 second shut down period of the gas valve, before the next re-ignition attempt.

Service Check List:

- Check if the flue terminal or draught diverter has soot marks, indicating poor combustion and/or a possible blocked heat exchanger.
- Check the burner flames are blue, not being disturbed by airflow, or have yellow flame tips. This would indicate the possibility of the following:
    - the burner is blocked or damaged.
    - the heat exchanger is blocked, sooted or split.
    - the burner has been starved of air (check installation for correct ventilation requirements).
- Check the burner gas pressure is correct for model unit.
- Check the gas valve and injectors are correct for the model and gas type used.
- Check the flue piping and/or piping is not blocked or exceeds the maximum length.

(Continued over page)

N-G1/lo Error Codes (cont)

Error Code 44 (cont)

Auto EMS models:

- Check for blockage in burner and/or burner venturi.
- Check that the zip burner is not blocked, and is correctly fitted on its gas injector.
- Check if the pressure test point screw is loose or removed.
- Check if strong wind conditions are current, causing down draft on burners.
- Check if an object or obstruction has been placed too close to the flue terminal (external models).
- Check if the front cover has been removed during unit operation (external models).
- Check the manifold and gas valve for gas leakage at the connections and joints.
- Check that there is no moisture or water entry into the unit, that could form a blockage to the burners.

MPS Models:

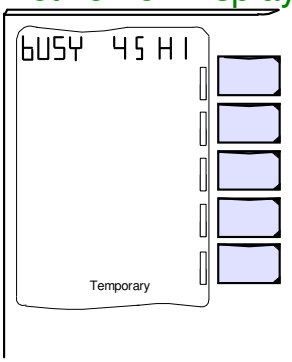
- **Perform Combustion Fan Air Differential Test (as per Page 116).**

- **Perform the appropriate MPS Gas Valve Test (Amplified or 1:1 as per Pages 117 & 118).**

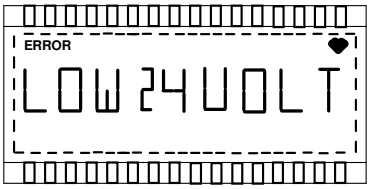
N-G1/lo Error Codes (cont)

Error Code 45

Networker Display



N-G1/lo Display



The Networker:

This Error is only a temporary operation malfunction, that will disappear when the condition is rectified, or the heater resets.

The N-G1/lo:

The unit is currently subjected to low power supply voltage, resulting in insufficient 24 Volt output for reliable ignition or operation.

This low voltage condition is usually only temporary.

Service Check List:

- Check incoming power supply voltage (minimum 200 V).
- Check if power supply is not from a generator (may not be 50 HZ or might be wave rectified).
- Check if the 2 Amp fuse blown.
- Check the transformer output.
- If the Network 506 is connected, check the current output on terminals 24 V and GND does not exceed 0.3 Amp's.
- **Check the N-G1/lo to N-G1/hi Interconnection loom and perform Earth Test (as per Page 121).**

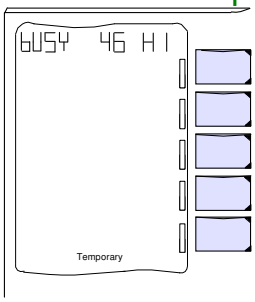
If the condition is still present following the above checks:

- Replace N-G1/hi Module and retest.

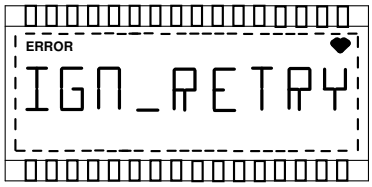
N-G1/lo Error Codes (cont)

Error Code 46

Networker Display



N-G1/lo Display



The Networker:

This Error is only a temporary operation malfunction, that will disappear when the condition is rectified, or the heater resets.

The N-G1/lo:

This error code indicates the unit is currently in a purge delay between ignition attempts.

The error will appear for 3 - 5 seconds only for MPS units, and for 5 minutes on Auto EMS heaters.

This operation period is part of the re-ignition attempt, when the pilot or burners have failed to light or be confirmed.
i.e. - MPS burners must be lit within 5 seconds.

- Auto EMS pilot must be lit within 60 seconds.

Service Check List:

- Check the gas supply is turned ON at the gas meter, and the appliance gas cock.
- Check the gas cylinders have gas, and the cylinder valve is open (LPG only).
- Check the air has been purged from the gas service piping.
- Check the gas pressure on the gas supply piping is sufficient, and/or not over pressured.
- Check if the pilot or burner flame ignites, but is not confirmed by the main flame sensing rod (A flame symbol is displayed on LCD when flame is sensed).
- Check for continuity between the main flame sensing rod and lead plug.
- Check the main flame sensor rod is located in the soft outer flame, and that the flame is stable.

(continued over page)

N-G1/lo Error Codes (cont)

Error Code 46 (cont).

- Check power supply polarity is correct.
- Check the voltage to the gas valve is maintained (i.e. 24V) at back of N-G1/lo gas valve loom plug.
- Check the heater has been set for the correct unit type on the N-G1/lo bridge link.
- **Check the N-G1/lo to N-G1/hi Interconnection loom and perform Earth Test (as per Page 121).**

Auto EMS models:

- Check that the gas valve pilot solenoid is energised, and the valve opens.
- Check the gas valve's pilot flow adjustment screw is correctly set.
- Disconnect pilot feed tube from valve and check for gas flow.
- Check pilot burner injector is not blocked or damaged.
- Check the pilot flame is properly formed.

MPS models:

- Check the main burner injector is aligned correctly with the main burner venturi throat (i.e. should be pointing horizontally level down the venturi throat, not angled up or down).
- Check that the burner shroud is properly sealed to prevent combustion fan air stream from disturbing the flame. Early build units without a fold down fence on the top edge of the shroud may require the shroud to be upgraded to the current type. Always replace the main burner as well, whenever the shroud is replaced.

or

- If the shroud has a fold down fence but too large a cut-out for the burner venturi to pass through, the gap should be sealed using part 8186 - Plate Shroud 6 Burner MPS and/or high temp silicone sealant.

- **Perform Combustion Fan Air Differential Test (as per Page 116).**
- **Perform the appropriate MPS Gas Valve Test (Amplified or 1:1 as per Pages 117 & 118).**

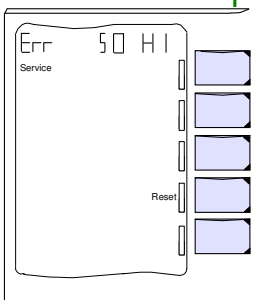
If the condition is still present following the above checks:

- Replace main burner and burner shroud assembly and retest.

N-G1/lo Error Codes (cont)

Error Code 50

Networker Display



N-G1/lo Display

The Networker:

This error can be reset by using the reset button to restart the heater, but the unit will probably lockout again, if the condition has not been rectified.

The N-G1/lo:

This error code indicates the unit has locked out after 4 ignition attempts without the flame being recognised on the main flame sensing rod.

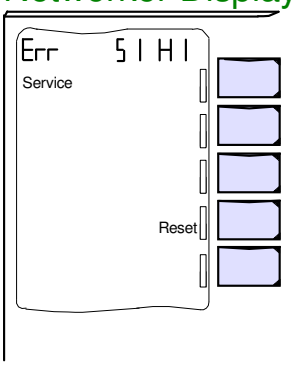
Service Check List:

Refer to Check list for Error Code 46: IGN_RETRY.

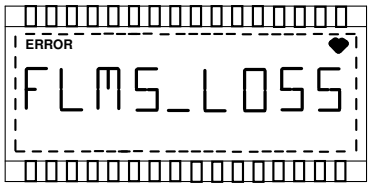
N-G1/lo Error Codes (cont)

Error Code 51

Networker Display



N-G1/lo Display



The Networker:

This error can be reset by using the reset button to restart the heater, but the unit will probably lockout again, if the condition has not been rectified.

The N-G1/lo:

This error code refers to an Auto EMS pilot loss, before the main burners have been turned ON.

Only 10 pilot flame re-ignitions are allowed, for pilot flame loss in the 5 second flame proving period that follows flame detection.

FLMS_LOSS is a lockout to indicate that the pilot flame was confirmed, and then lost 10 consecutive times.

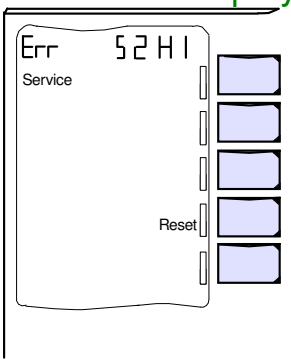
Service Check List:

- Check gas supply pressure is not too high or low.
- Check the pilot burner and injector is clean, producing a properly formed flame.
- Check the pilot flame sensing rod is clean, and correctly located.
- Check for damage or loose connections to the pilot flame sensor lead and plug.
- Check the gas valve is providing a continuous steady gas flow to the pilot burner.
- Check there is no air disturbance to the pilot flame (i.e. fan operation, wind etc.).
- **Check the N-G1/lo to N-G1/hi Interconnection loom and perform Earth Test (as per Page 121).**

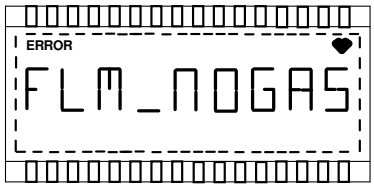
N-G1/lo Error Codes (cont)

Error Code 52

Networker Display



N-G1/lo Display



The Networker:

This error can be reset by using the reset button to restart the heater, but the unit will probably lockout again, if the condition has not been rectified.

The N-G1/lo:

This error indicates that a pilot or burner flame, has been detected when the gas valve is not energised, and flame is not expected.

Service Check List:

- **Check the N-G1/lo to N-G1/hi Interconnection loom and perform Earth Test (as per Page 121).**
- Check the pilot burner and/or burner main flame sensor lead is not shorted to Earth.
- Check if a pilot or burner flame is present with the unit turned OFF.
- Check the gas valve is not jammed open due to malfunction, obstruction or blockage.
- Check if the 24 Volt power supply to the valve has been turned OFF, as expected in the normal operation.

MPS models:

- **Perform Combustion Fan Air Differential Test (as per Page 116).**
- **Perform the appropriate MPS Gas Valve Test (Amplified or 1:1 as per Pages 117 & 118).**

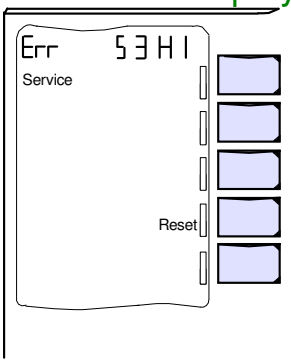
If the condition is still present following the above checks:

- Replace N-G1/hi module and check.
- Replace N-G1/lo module and check.

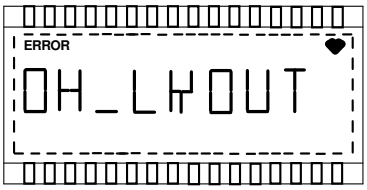
N-G1/lo Error Codes (cont)

Error Code 53

Networker Display



N-G1/lo Display



The Networker:

This error can be reset by using the reset button to restart the heater, but the unit will probably lockout again, if the condition has not been rectified.

The N-G1/lo:

This error indicates the unit has had 2 consecutive over temperature conditions, within the 13 minute Time Safe Guard period, with the Networker OFF (not calling for heat).

The Time Safe Guard period, is the time following a power up, or the fan operation completion at the end of a heating cycle.

Refer to check lists for:

- Error Code 40: OHEAT_R-A
- Error Code 41: OHEAT_S-A
- Error Code 42: OHEAT_THM

Service Check List:

- Check if the unit has been operating on a hot day following a power up.
- Check if the unit is ceiling mounted with a high level return air grille.
- Check that the fan speed is sufficient for the system so that over heating will not result.
- Check the fan motor is functioning correctly, and is not blocked or obstructed.

(Continued over page)

N-G1/lo Error Codes (cont)

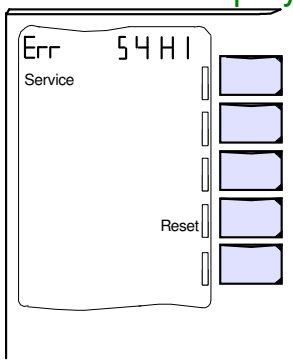
Error Code 53 (cont)

- Check the unit is not operating in FAN_LIMP mode.
- Check the gas valve is not jammed open and passing gas when not energised.
- Check the return air intake is not subjected to high temperature from an external source (i.e. not typical domestic system).
- Check the wire loom and plug connections to the switch are not open circuit, i.e. wire fallen off switch.
- Check that the supply air thermistor is not incorrectly fitted in the return air duct.

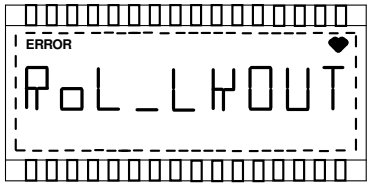
N-G1/lo Error Codes (cont)

Error Code 54

Networker Display



N-G1/lo Display



The Networker:

This error can be reset by using the reset button to restart the heater, but the unit will probably lockout again, if the condition has not been rectified.

The N-G1/lo:

This error indicates the unit has locked out, due to 3 consecutive flame roll out detected, within a heating cycle.

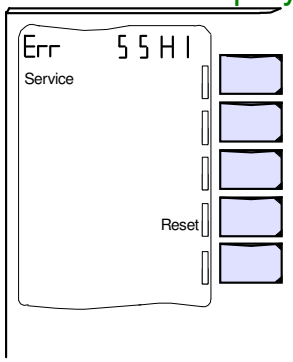
Service Check List:

- Refer to Check list for Error Code 44: RoLLOuT.

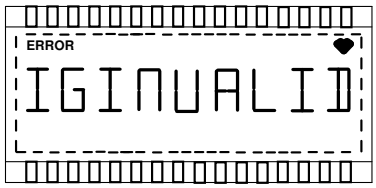
N-G1/lo Error Codes (cont)

Error Code 55

Networker Display



N-G1/lo Display



The Networker:

This error can be reset by using the reset button to restart the heater, but the unit will probably lockout again, if the condition has not been rectified.

The N-G1/lo:

This error indicates that the pilot flame (Auto EMS), or burner flame (MPS), was lost within 10 seconds of the **main valve** being energised (Ignition Confirming Period), **6 consecutive times.**

This error is more likely to occur due to poor gas pressure on an Auto EMS unit, where the pilot flame diminishes as the main burners starve the pilot's gas supply.

Service Check List:

- Check gas supply pressure is not too low.
- Check the main flame sensing rod is clean and correctly located.
- Check the burner's flame is stable and well formed - pilot and/or burners may require cleaning.
- Check the voltage to the gas valve is maintained (i.e. 24V) at back of N-G1/lo gas valve loom plug.

(Continued over page)

N-G1/lo Error Codes (cont)

Error Code 55 (cont.)

- **Check the N-G1/lo to N-G1/hi Interconnection loom and perform Earth Test (as per Page 121).**

- Check for damage or loose connections to the main flame sensor lead and plug.

Auto EMS models:

- Check the gas valve operation is providing continuous gas to the pilot burner.

- Check there is not air disturbance to the pilot flame (i.e. fan operation, wind etc.).

MPS models:

- Check the main burner injector is aligned correctly with the main burner venturi throat (i.e. should be pointing horizontally level down the venturi throat, not angled up or down).

- Check that the burner shroud is properly sealed to prevent combustion fan airstream from disturbing the flame. Early build units without a fold down fence on the top edge of the shroud may require the shroud to be upgraded to the current type. Always replace the main burner as well, whenever the shroud is replaced.

or

- If the shroud has a fold down fence but too large a cut-out for the burner venturi to pass through, the gap should be sealed using part 8186 - Plate Shroud 6 Burner MPS and/or high temp silicone sealant.

- **Perform Combustion Fan Air Differential Test (as per Page 116).**

- **Perform the appropriate MPS Gas Valve Test (Amplified or 1:1 as per Pages 117 & 118).**

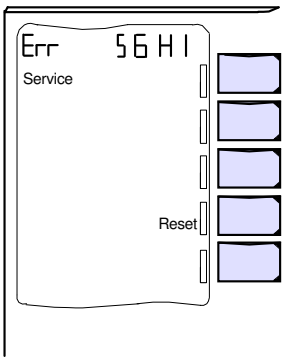
If the condition is still present following the above checks:

- Replace main burner and burner shroud assembly and retest.

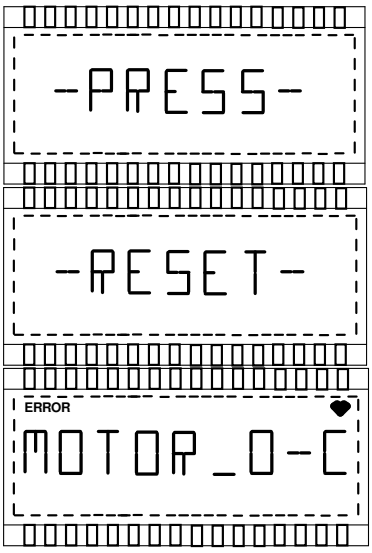
N-G1/lo Error Codes (cont)

Error Code 56

Networker Display



N-G1/lo Display



(Example Only)

The Networker:

This error can be reset by using the reset button to restart the heater, but the unit will probably lockout again, if the condition has not been rectified.

The subsequent lockout will give a more detailed information.

This error code indicates a lockout has occurred, and the heater has since been powered up again.

This may be the case if there is a power interruption after a lockout had registered, but due to the power loss the error information has been lost.

The N-G1/lo:

The LCD on the N-G1/lo will indicate the lockout that is current, refer to the check list for that condition (e.g. Error Code 60: Motor_O-C).

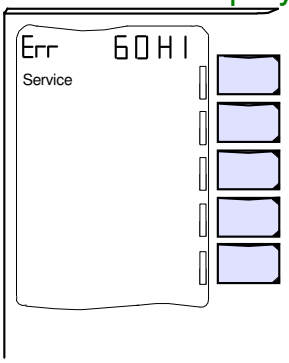
Service Check List:

- Check the event log for other lockouts that may also be related.

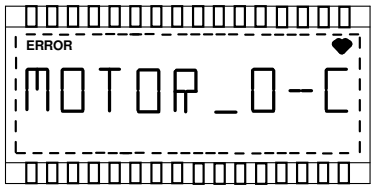
N-G1/lo Error Codes (cont)

Error Code 60

Networker Display



N-G1/lo Display



The Networker:
This error does not offer a reset to the user and should only be reset by a service technician, using the reset button on the N-G1/lo.

The N-G1/lo:
This error code indicates the main circulation fan motor is "open circuit".

This condition may be the result of the wiring to the motor, or the plug connections, not making the proper circuit or contact for the motor to operate correctly.

The motor open circuit is also possible, if the motor's internal over temperature switch is tripped, due to excessive motor heat.

Service Check List:
- Check motor loom connections at the N-G1/hi and 9 pin plug.
- Check motor winding resistance - refer diagrams on pages 46 - 58 of this manual.
- Check if the motor casing is HOT, indicating the motor's thermal over temperature switch may be tripped.

If motor hot:
- Check motor bearings for wear and stiffness.
- Check the capacitor is the correct size and/or faulty.
- Check the fan impellor is not damaged, jammed, blocked or obstructed.
- Check the incoming power supply voltage.

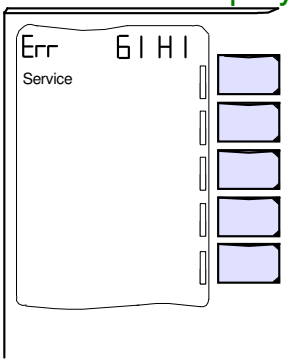
If the condition is still present following the above checks:

- Replace N-G1/hi module & retest.

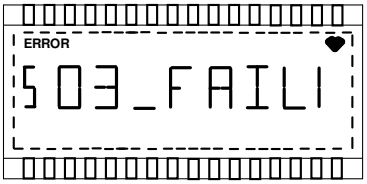
N-G1/lo Error Codes (cont)

Error Code 61

Networker Display



N-G1/lo Display



The Networker:

This error does not offer a reset to the user and should only be reset by a service technician, using the reset button on the N-G1/lo.

The N-G1/lo:

This error indicates the unit is not operating due to a malfunction or fault of the heaters N-G1/lo module.

Service Check List:

Check the N-G1/lo to N-G1/hi Interconnection loom and perform Earth Test (as per Page 121).

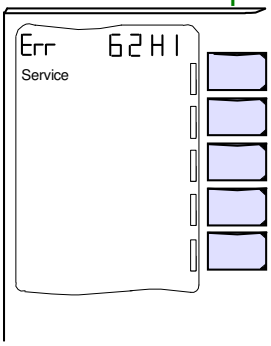
- After checking the loom and testing the Earth circuit, if the fault remains, then replace the N-G1/lo.
- Check and note all service and installer parameters.

If the error reoccurs, replace N-G1/lo module.

N-G1/lo Error Codes (cont)

Error Code 62

Networker Display



N-G1/lo Display

The Networker:

This error does not offer a reset to the user and should only be reset by a service technician, using the reset button on the N-G1/lo.

The N-G1/lo:

This error code indicates the low voltage Hot Surface Electrode is open circuit, and the unit is locked out.

The HSI_LOCK will also result if the incoming power supply is in excess of 270 Volts.

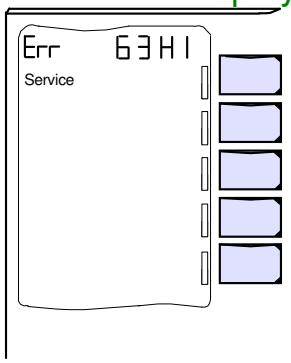
Service Check List:

- Check the HSI loom is plugged into the N-G1/lo module.
- Check the HSI electrode is not damaged - split, cracked or coated.
- Check the HSI wire loom lead and plug connections.
- Check the HSI electrode has not shorted to Earth.
- The resistance of the HSI electrode and loom is less than 10 Ohm's @ 20ºC. (normally 5 Ohm's).
- Check burner manifold for damage (MPS only).
- Check the HSI loom plug terminals for low Voltage output from the N-G1/lo.
  - If 24 Volts output low, check through check list for Error Code 44: LOW24VOLT.
  - After changing the Hot Surface Electrode for any reason, please check voltage output to the electrode from the N-G1/Lo at the HSI loom plug. It should be no more than 22.5V. A voltage output any higher than 22.5V indicates a faulty N-G1/Lo module (internal regulator fault).

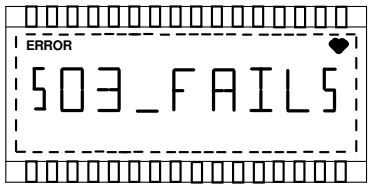
N-G1/lo Error Codes (cont)

Error Code 63

Networker Display

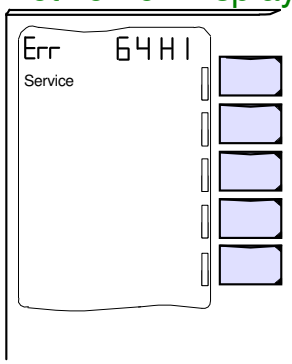


N-G1/lo Display



Error Code 64

Networker Display



N-G1/lo Display

The Networker:

These errors do not offer a reset to the user and should only be reset by a service technician, using the reset button on the N-G1/lo.

The N-G1/lo:

These errors indicate the unit is not operating, due to a malfunction or fault of the heater's N-G1/lo module.

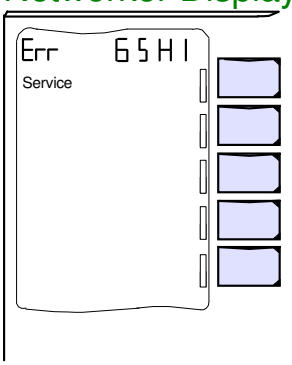
Service Check List:

- Check for loose plug wire in gas valve plug loom at rear of N-G1/lo.
- If N-G1/lo will not reset or the error reoccurs, replace N-G1/lo module.

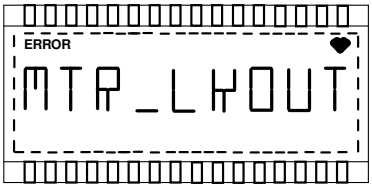
N-G1/lo Error Codes (cont)

Error Code 65

Networker Display



N-G1/lo Display



The Networker:

This error does not offer a reset to the user and should only be reset by a service technician, using the reset button on the N-G1/lo.

The N-G1/lo:

The unit is locked out due to fan motor open circuit, and the fan motor speed sensor signal has not been received by the N-G1/lo.

OR

The unit was operating in FAN_LIMP mode, and an over temperature switch has tripped.

Service Check List:

- Check motor loom connections at the N-G1/hi and 9 pin plug.
- Check motor winding resistance - refer diagrams on pages 46 - 58 of this manual.
- Check if the motor casing is HOT, indicating the motor's thermal over temperature switch may be tripped.

If motor hot:

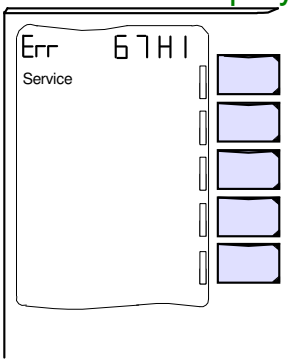
- Check motor bearings for wear and stiffness.
- Check the capacitor is the correct size and/or faulty.
- Check the fan impellor is not damaged, jammed, blocked or obstructed.
- Check the incoming power supply voltage.

- **Perform Fan Speed Sensor Test (as per Page 121).**
- Replace N-G1/hi module and retest.

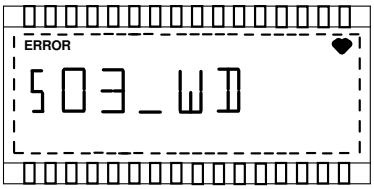
N-G1/lo Error Codes (cont)

Error Code 67

Networker Display



N-G1/lo Display



The Networker:

This error does not offer a reset to the user and should only be reset by a service technician, using the reset button on the N-G1/lo.

The N-G1/lo:
This error indicates the unit is not operating due to a malfunction or fault of the heater's N-G1/lo module.

Service Check List:

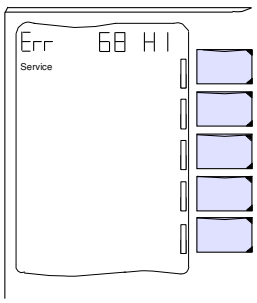
- Check and note all service and installer parameters.

If N-G1/lo will not reset or the error reoccurs, replace N-G1/lo module.

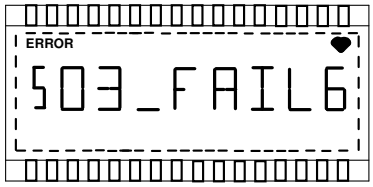
N-G1/lo Error Codes (cont)

Error Code 68

Networker Display



N-G1/lo Display



OR

The Networker:

This error does not offer a reset to the user and should only be reset by a service technician, using the reset button on the N-G1/lo.

The N-G1/lo:

This error indicates the unit is not operating due to a malfunction or fault of the heaters N-G1/lo module.
OR
The link circuit on the N-G1/lo module between terminals 24V and STAT is open circuit (pre version 7 models).
Note: this error will also display with FUSE_BLOW error as they are both on the same part of the N-G1/lo 24 Volt circuit.

Service Check List:

- **Check the N-G1/lo to N-G1/hi Interconnection loom and perform Earth Test (as per Page 121).**

- Check the link has not been removed from the N-G1/lo module at 24V and STAT terminals.

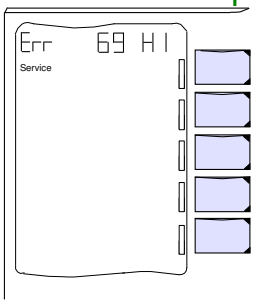
- Check the link is not damaged and that contact to both terminals are good.

After checking the loom and testing the Earth circuit, if the fault remains, then replace the N-G1/lo.

N-G1/lo Error Codes (cont)

Error Code 69

Networker Display



N-G1/lo Display

The Networker:

This error does not offer a reset to the user and should only be reset by a service technician, using the reset button on the N-G1/lo.

The N-G1/lo:

The FUSE_BLOW condition may also be associated with another failure or malfunction, therefore check if any other error codes alternate with this code display. i.e. nCCFG_Err, Low Volts and RoLL-TErr.

This error code indicates the 2 Amp fuse on the N-G1/lo has blown due to a short circuit on the 24 Volt wiring circuit.

The short circuit may be either internal to the unit, or external, if any wiring has been connected to the 24 V terminal block i.e. Network 506 zoning and add-on refrigeration module.

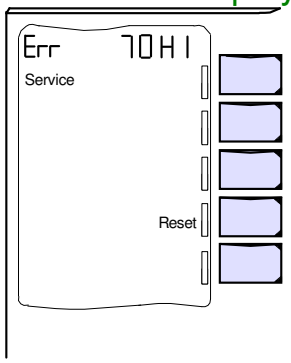
Service Check List:

- Check if the Hot Surface Ignitor element or loom has been shorted to Earth.
- Check if the 24 Volt internal wiring circuit to the over temperature switches and gas valve is not shorted to Earth.
- Check that any wiring connected to the 24V terminal is not shorted to Earth.
- Check that the wiring to the refrigeration compressor relay on the Network 506 "REFRIG" terminal is not shorted to Earth.
- Check the gas valve solenoid coil is not shorted.
- Check that the N-G1/lo module LCD has a heart pulsing (circuit short may be internal to N-G1/lo).

N-G1/lo Error Codes (cont)

Error Code 70

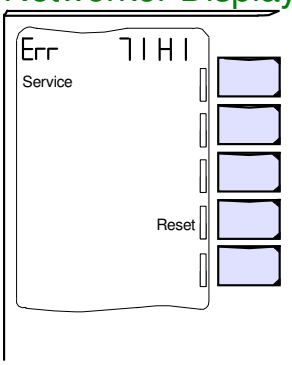
Networker Display



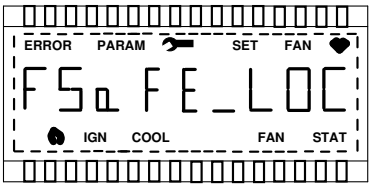
N-G1/lo Display

Error Code 71

Networker Display



N-G1/lo Display



The Networker:

These errors do not offer a reset to the user and should only be reset by a service technician, using the reset button on the N-G1/lo.
The Networker may "beep" to alert the user of the problem.
A Reset button will appear to turn off the beeping sound.

The N-G1/lo:

These error codes indicate the unit is locked out due to the loss of flame on the backup flame sensor.

The flame loss must be continuous for a period of 90 seconds during normal operation after the ignition process has been completed.

(Continued over page)

N-G1/lo Error Codes (cont)

Error Code 70 & 71 (cont)

Service Check List:

- **Check the N-G1/lo to N-G1/hi Interconnection loom and perform Earth Test (as per Page 121).**

- Check the backup flame sensor is not shorted to Earth.
- Check the backup flame sensor is not coated preventing correct flame sensing.
- Check the backup flame sensor loom is connected to the N-G1/lo and the terminal connection is good.
- Check the backup flame sensor and loom are not open circuit.
- Check the burner (adjacent to sensor) lights and the cross ignition of the manifold.
- Check the burner / manifold gas pressure is within the correct operating range.
- Check the incoming gas supply for fluctuation, excessive high or low pressure.

Auto EMS models:

- Check that the backup flame sensor is the new type (probe pointing left with new style bracket) and that it is mounted behind the R.H.S. manifold tab (Ceramic body should end up sitting beside the zip burner not above it). NOTE: Sometimes the rod may not be located correctly in the flame. Bend the probe if necessary to ensure that it is in the flame.

MPS models:

- Check the main burner injector is aligned correctly with the main burner venturi throat (i.e. should be pointing horizontally level down the venturi throat, not angled up or down).

(Continued over page)

N-G1/lo Error Codes (cont)

Error Code 70 & 71 (cont)

- Check that the burner shroud is properly sealed to prevent combustion fan airstream from disturbing the flame. Early build units without a fold down fence on the top edge of the shroud may require the shroud to be upgraded to the current type. Always replace the main burner as well, whenever the shroud is replaced.

or

- If the shroud has a fold down fence but too large a cut-out for the burner venturi to pass through, the gap should be sealed using part 8186 - Plate Shroud 6 Burner MPS and/or high temp silicone sealant.

- **Perform Combustion Fan Air Differential Test (as per Page 116).**

- **Perform the appropriate MPS Gas Valve Test (Amplified or 1:1 as per Pages 117 & 118).**

Networker Access to Installer & Service Parameters

Heater and Refrigeration Cooling Installer Parameters

1000	*01*	*H1*	**Heater Fan Operation.**
_950	*02*	*H1*	**Econ Fan Speed (Adaptive zoning).**
1500	*03*	*H1*	**Cooling Fan Operation.**
___1	*04*	*H1*	**Heater ID Number.**
_500	*05*	*H1*	**Circulation Fan Operation.**
__65	*06*	*H1*	**Supply Air Thermistor** **Auto EMS Modulation Set Point Temperature.**
___1	*07*	*H1*	**Network 506 Module Mode.**

Networker Access to Installer & Service Parameters (cont)

Networker Wall Control (Zoning) Installer Parameters

Parameter Display	Parameter Description	Entry Reference
1 01 n1	**Refrig Common Zone**	Refrig/Heater **ID No.**
0 03 n1	**Refrig Zone A, Unit**	Refrig/Heater **ID No.**
0 04 n1	Refrig Zone A Relay	**Relay** No.
0 06 n1	**Refrig Zone B, Unit**	Refrig/Heater **ID No.**
0 07 n1	Refrig Zone B Relay	**Relay** No.
0 09 n1	**Refrig Zone C, Unit**	Refrig/Heater **ID No.**
0 10 n1	Refrig Zone C Relay	**Relay** No.
0 12 n1	**Refrig Zone D, Unit**	Refrig/Heater **ID No.**
0 13 n1	Refrig Zone D Relay	**Relay** No.

1 15 n1	**Heating Common Zone**	Heater **ID** No.
0 17 n1	**Heating Zone A, Unit**	Heater **ID** No.
0 18 n1	Heating Zone A Relay	**Relay** No.
0 20 n1	**Heating Zone B, Unit**	Heater **ID** No.
0 21 n1	Heating Zone B Relay	**Relay** No.
0 23 n1	**Heating Zone C, Unit**	Heater **ID** No.
0 24 n1	Heating Zone C Relay	**Relay** No.
0 26 n1	**Heating Zone D, Unit**	Heater **ID** No.
0 27 n1	Heating Zone D Relay	**Relay** No.

1 29 n1	**Evap Common Zone**	Evap **ID** No.
0 31 n1	**Evap Cooling Zone A, Unit**	Evap **ID** No.
0 34 n1	**Evap Cooling Zone B, Unit**	Evap **ID** No.
0 37 n1	**Evap Cooling Zone C, Unit**	Evap **ID** No.
0 40 n1	**Evap Cooling Zone D, Unit**	Evap **ID** No.

0 43 n1	Heating OFF cycle Circulation Fan Operation	0 = **OFF** 1 = **ON**

Networker Access to Installer & Service Parameters (cont)

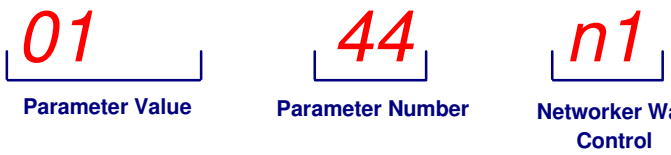
Heater Service Parameters

Default Display Value / Parameter No.	Adjustment Range	Description
70 01 H1	50 - 160	Auto EMS Natural Gas Minimum Rate (mAmp)
115 02 H1	100 - 160	Auto EMS Natural Gas Maximum Rate (mAmp)
70 03 H1	50 - 100	Auto EMS Natural Gas Start Rate (mAmp)
2 04 H1	1 - 15	MPS Combustion Fan Minimum Drive Level
15 05 H1	1 - 15	MPS Combustion Fan Maximum Drive Level
5 06 H1	1 - 15	MPS Combustion Fan Start Drive Level
45 07 H1	40 - 55	Heat up Outlet Cut Off Temperature
10 08 H1	5 - 20	Fan Cool Down Gradient
50 09 H1	40 - 55	Cool Down Outlet Cut Off Temperature
150 10 H1	30 - 150	Do Not Alter
100 11 H1	50 - 160	Auto EMS LP Gas Minimum Rate (mAmp)
140 12 H1	100 - 160	Auto EMS LP Gas Maximum Rate (mAmp)
70 13 H1	50 - 100	Auto EMS LP Gas Start Rate (mAmp)
10 17 H1	1 - 15	MPS Combustion Fan Intermediate Drive Level
5 18 H1	0 - 20	Do Not Alter
0 19 H1	0 - 20	Do Not Alter
0 20 H1	0 - 40	Do Not Alter

Networker Access to Installer & Service Parameters (cont)

Networker Wall Control Service Parameters

Example of the Networker parameter display in Network Wall Control mode



Parameter Display and Description		Default
18 44 n1 **MIN_HEAT_ON_AND_OFF_TIME** This is the minimum time the call for heat will be on or off in *steady state mode*.	10sec per increment	18 X 10 sec = 180 sec = **3 minutes**
60 45 n1 **MIN_COOL_ON_AND_OFF_TIME** * For refrig cooling. This is the minimum time the call for cooling will be on or off in *steady state mode*.	10sec per increment	60 X 10 sec = 600 sec = **10 minutes**
30 46 n1 **LOW_TRANSIENT_OFF_TIME** This is the time for which the call for heat will remain off once the Networker temperature reaches the LOW TRANSIENT TARGET OFFSET. Reducing this will increase the start-up room air temperature overshoot.	10sec per increment	30 X 10 sec = 300 sec = **5 minutes**
06 47 n1 **LOW_TRANSIENT_TARGET_OFFSET** This is the amount below the set point at which the call for heat goes off in *Low Transient mode*. Decreasing this value will also increase the amount of start up room air temperature overshoot.	0.5^0C. per increment	6 X 0.5^0C. = **3^0C.**
09 48 n1 **NETWORKER_TEMPERATURE_OFFSET** This is the temperature offset the Networker display reads compared to the actual thermistor temperature registered	0.5^0 C per increment. (0-20 range) 10 = 0^0C.	9 = **-0.5^0C.**
. ***02 49 n1*** **COOLER_CONTROL_TYPE** This is the setting for the Networker message handling type for Cooler Controls. N-E1 & N-E2 pre Sept 1998 = 0. N-E1 & N-E2 post Sept 1998 = 1.	0 - 2	**2**
0 50 n1 **COOLER_TEMPERATURE_DISPLAY** This parameter is to activate the temperature display in Cooler mode. OFF = 0 and ON = 1	0 - 1	**0**

N-G1/lo Error Codes Test Procedures

Amplified MPS Gas Valve Operation Check

Gas Type NG or LPG

Service Technician:
Serial No:
Service Call Ref:
Gas valve Serial No:

Original Gas Valve

Drive Level	2	Drive Level	10
High (+) Air Signal		High (+) Air Signal	
(Subtract)		(Subtract)	
Low (-) Air Signal	-	Low (-) Air Signal	-
Differential	=	Differential	=
Gas Content (As per Differential Chart)		Gas Content (As per Differential Chart)	
(Add)		(Add)	
Low (-) Air Signal	+	Low (-) Air Signal	+
Expected G.V.O.P.	=	Expected G.V.O.P.	=
Actual G.V.O.P	-	Actual G.V.O.P	-
(Subtract)		(Subtract)	
G.V.O.P. Differential	=	G.V.O.P. Differential	=

New Gas Valve

Drive Level	2	Drive Level	10
High (+) Air Signal		High (+) Air Signal	
(Subtract)		(Subtract)	
Low (-) Air Signal	-	Low (-) Air Signal	-
Differential	=	Differential	=
Gas Content (As per Differential Chart)		Gas Content (As per Differential Chart)	
(Add)		(Add)	
Low (-) Air Signal	+	Low (-) Air Signal	+
Expected G.V.O.P.	=	Expected G.V.O.P.	=
Actual G.V.O.P	-	Actual G.V.O.P	-
(Subtract)		(Subtract)	
G.V.O.P. Differential	=	G.V.O.P. Differential	=

N-G1/lo Error Codes Test Procedures (cont)

Natural Gas, Ampl'n = 5, Offset = -50

Air Differential	Gas Content	Air Differential	Gas Content
0	-50	100	450
2	-40	102	460
4	-30	104	470
6	-20	106	480
8	-10	108	490
10	0	110	500
12	10	112	510
14	20	114	520
16	30	116	530
18	40	118	540
20	50	120	550
22	60	122	560
24	70	124	570
26	80	126	580
28	90	128	590
30	100	130	600
32	110	132	610
34	120	134	620
36	130	136	630
38	140	138	640
40	150	140	650
42	160	142	660
44	170	144	670
46	180	146	680
48	190	148	690
50	200	150	700
52	210	152	710
54	220	154	720
56	230	156	730
58	240	158	740
60	250	160	750
62	260	162	760
64	270	164	770
66	280	166	780
68	290	168	790
70	300	170	800
72	310	172	810
74	320	174	820
76	330	176	830
78	340	178	840
80	350	180	850
82	360	182	860
84	370	184	870
86	380	186	880
88	390	188	890
90	400	190	900
92	410	192	910
94	420	194	920
96	430	196	930
98	440	198	940

To check Gas Valve Outlet Pressure (GVOP)

- Look up Air differential on chart
- Read Gas Content related to Air Differential
- Add Gas Content figure to Negative Air Signal
- Compare to actual GVOP

LPG (Prop), Ampl'n = 25, Offset = -350

Air Differential	Gas Content	Air Differential	Gas Content
0	-350	100	2150
2	-300	102	2200
4	-250	104	2250
6	-200	106	2300
8	-150	108	2350
10	-100	110	2400
12	-50	112	2450
14	0	114	2500
16	50	116	2550
18	100	118	2600
20	150	120	2650
22	200	122	2700
24	250	124	2750
26	300	126	2800
28	350	128	2850
30	400	130	2900
32	450	132	2950
34	500	134	3000
36	550	136	3050
38	600	138	3100
40	650	140	3150
42	700	142	3200
44	750	144	3250
46	800	146	3300
48	850	148	3350
50	900	150	3400
52	950	152	3450
54	1000	154	3500
56	1050	156	3550
58	1100	158	3600
60	1150	160	3650
62	1200	162	3700
64	1250	164	3750
66	1300	166	3800
68	1350	168	3850
70	1400	170	3900
72	1450	172	3950
74	1500	174	4000
76	1550	176	4050
78	1600	178	4100
80	1650	180	4150
82	1700	182	4200
84	1750	184	4250
86	1800	186	4300
88	1850	188	4350
90	1900	190	4400
92	1950	192	4450
94	2000	194	4500
96	2050	196	4550
98	2100	198	4600

To check Gas Valve Outlet Pressure (GVOP)

- Look up Air differential on chart
- Read Gas Content related to Air Differential
- Add Gas Content figure to Negative Air Signal
- Compare to actual GVOP

N-G1/Io Error Codes Test Procedures (cont)

Combustion Fan Air Differential Test: (Digital Manometer required)

On heaters with Amplified gas valves (i.e. VK8105R) the high air signal can be taken from The gas valve's (+) test point , and the low air signal from the burner chamber.

On heaters with 1:1 gas valves (i.e. VK8115V or SIT 848 SIGMA) the high air signal can be taken by disconnecting the black, high (+) air signal hose from the gas valve and Connecting it to your manometer. Again the low air signal is taken from the burner chamber.

• Isolate the gas at the appliance gas cock, then check for zero air differential with a blocked flue, with the combustion fan operating on drive level 15 (i.e. during 'Post Purge' period).
Positive air signal differential indicates low air signal loss, check combustion chamber, Heat exchanger, flue outlet, hoses and connections etc.

• Unblock and refit the flue pipe or terminal, then check and record the high air signal With the combustion fan operating on drive level 15, again during 'PostPurge' period.

• Reconnect the black, high (+) air signal hose to the gas valve (if required).

• Drive the maximum combustion fan level to 15 and check the low air signal:
The high air signal should be approximately 400 - 460 Pa, and the low air signal should Be 100 - 150 Pa less than the high air signal for all units.

If the air signal differential is too great:
• Check the incoming power supply voltage is not too high.
• Check the flue is the required minimum length and size.
• Check the combustion chamber, heat exchanger, flue outlet, hoses and connections for air loss.
• Check the combustion box cover is secured and sealed.

If the air signal differential is too low:
• Check for blockage/s on combustion fan air signal hoses and connections.
• Check flue doesn't exceed the maximum length for the size.
• Check for blockage to condensate outlet (HE only).
• Check for blocked or sooted heat exchanger or flue discharge.
• Check for damaged or restricted flue terminal or cowl.
• Check for low power supply voltage.

N-G1/lo Error Codes Test Procedures (cont)

5:1 & 25:1 Amplified Gas Valve Test (Digital Manometer required)

- Check if the gas valve inlet pressure is low, check gas supply pressure, piping and gas supply meter. Minimum *flowing* pressure required is **1 kPa for Nat Gas** and **2.5 kPa for LP Gas** (at combustion drive level 15).

- Check if the gas valve inlet pressure is too high, gas valve maximum pressure regulator may require adjustment.

- Complete Combustion Fan Air Differential Test.

- **Now check the Gas Valve Outlet Pressure (G.V.O.P.)** is within specification at combustion drive levels 2 and 10 using the Amplified MPS Gas Valve chart and formula.

- **Determine the differential** between the high and low combustion air Signals.

- Look up the air differential on the chart (page 115), and **read the Gas Content** value that is related to the differential.

- **Add the Gas Content to the Negative Air Signal** to determine the expected G.V.O.P.

- **Compare the actual G.V.O.P.** to the expected pressure to determine if the valve is within specification.

- If the actual G.V.O.P. is lower than the Expected G.V.O.P. figure calculated, this does not indicated a valve problem. Make sure the unit can sustain a good flame at Drive Level 2 setting.

- If the actual G.V.O.P. is greater by **more than the 25 Pa (N.Gas) or 175 Pa (LPG) at Drive Level 2,** then the valve is faulty and should be replaced.

- If the actual G.V.O.P. is greater by **more than the 100 Pa (N.Gas) or 700 Pa (LPG) at Drive Level 10,** then the valve is faulty and should be replaced. Note: This is very unlikely given the valve is within specification at Drive Level 2.

N-G1/lo Error Codes Test Procedures (cont)

1:1 Gas Valve Test (Digital Manometer required)

- Check if the gas valve inlet pressure is low, check gas supply pressure, piping and gas supply meter. Minimum *flowing* pressure required is **1 kPa for Nat Gas** and **2.5 kPa for LP Gas** (at combustion drive level 15). Also check that the gas valve inlet pressure is not too high. Lockup pressure should not exceed 3.5 kPa.

- Complete Combustion Fan Air Differential Test.

- Disconnect the black hose from the Gas Valve and measure the high air signal at drive level 15, should be between 400 & 460 pascals.

- Reconnect the black hose to the gas valve and start the unit. If the unit will not start turn the gas valve offset adjustment clockwise half a turn and wait for the Ignition retry. Repeat this adjustment until the unit is able to start.

- Once the unit has completed ignition, force the unit to drive level 15. Using a Digital Manometer, connect it to the burner chamber test point and measure the combustion chamber pressure. Burner chamber pressure should be between 290 and 320 pascals for all MPS units. See notes on page 119 for adjustment.

- Once the correct burner chamber pressure is achieved, measure the pressure at **GVOP1** while the unit is running at **drive level 15**. The pressure at **GVOP1** should be approximately **20 pascals less** than the High air signal.
  Example - High air signal of 400 pascals.
  GVOP1 should be at or adjusted to 380 pascals.

NOTE: GVOP1 SHOULD NEVER EXCEED THE BURNER PRESSURE GIVEN ON THE DATA LABEL.

- To Adjust the GVOP1 pressure, rotate the offset adjustment screw (clockwise to increase GVOP1 and anticlockwise to reduce GVOP1).

- Reduce the heater down to **Drive Level 2** and perform the combustion fan blockage test. While observing the flame slowly cover the combustion fan with a suitable object. The flames should extinguish as all of the air to the combustion fan is blocked off. If the flame fails to extinguish, turns yellow and starts wandering in the combustion chamber, the heater is running in a positive offset and the entire test should be completed again.

- Restore the service parameters to normal. Close all pressure test points and test for leaks.

N-G1/lo Error Codes Test Procedures (cont)

Adjusting Burner Chamber Pressure

The burner chamber pressure should fall within the range given for each unit. If the pressure doesn't fall within the given range adjustments need to be made to the unit. All MPS units have an adjustable orifice between the combustion fan and the combustion chamber. This adjustable orifice can be used to raise or lower the chamber pressure sightly. Opening the orifice increases the chamber pressure while closing the orifice lowers the chamber pressure. Some MPS units while running at drive level 15 may have a lower chamber pressure than expected, opening the orifice may increase the chamber pressure but may still fall under the requirements. This mainly occurs on the MPS ME units as the Heat exchanger is less restrictive than the HE Heat exchanger.

A lower chamber pressure can cause -

- Rumbling noises from the unit.
- Ignition failures.
- Flame lift off from the burner (error 71).

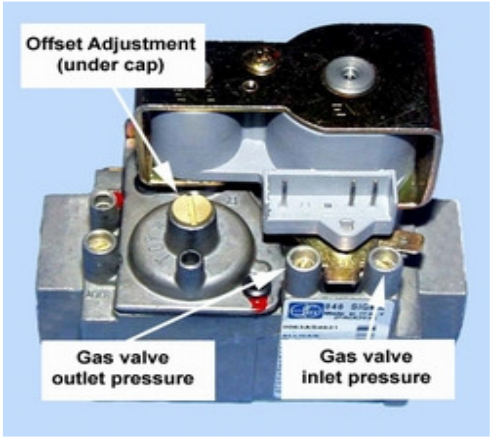
MPS ME Internal Units - have a flue restrictor located on the flue outlet plate on the top of the unit. This can be used to raise the burner chamber pressure to the expected amount. Closing the flue restrictor will increase the burner chamber pressure, while opening the flue restrictor will lower the burner chamber pressure.

MPS ME External Units - do not have a flue restrictor fitted from production. If the chamber pressure cannot be achieved, **Part 8161 - DISK RESTRICTOR MPS FLUE** can be used to raise the burner chamber pressure to the required pressure.

N-G1/Io Error Codes Test Procedures (cont)

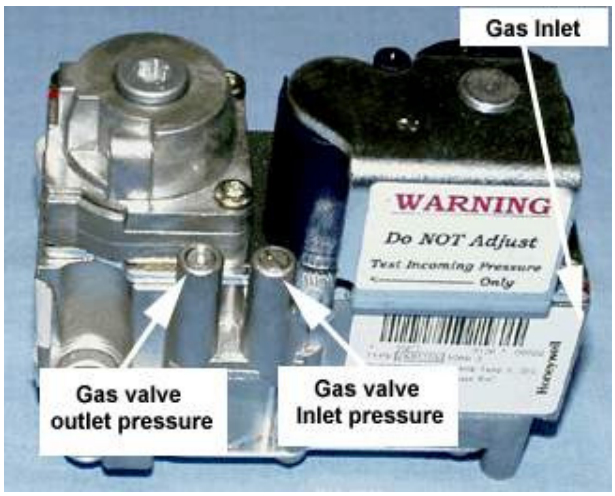
1:1 Gas Valve Test Points

The Sit 1:1 valve has two different gas valve outlet test points of which only GVOP1 is used.



SIT 848 SIGMA 1:1 Gas valve.

Honeywell VK8115V valves only have one Gas Valve Outlet Pressure (GVOP) test point as shown below. Use this test point when the procedure refers to GVOP 1.



Honeywell 1:1 Gas Valve.

N-G1/lo Error Codes Test Procedures (cont)

Interconnection loom and Earth Test:

- Check the loom and plug connections on the 11 strand wire loom between the N-G1/lo and N-G1/hi. See Diagram on Page 113.
    - Check the heater's internal Earth.
        - Turn unit OFF and disconnect power lead.
            - Disconnect the 11 strand wire plug and loom from the N-G1/lo module.
                - Test the continuity (less then 10 Ohm's) between the cabinet (ground) and the orange lead in plug (3rd on RHS facing cable end on non clip side of plug).
                    - If greater than 10 Ohm's - check all leads, plugs and connections back to main Earth on N-G1/hi.

Fan Speed Sensor Test

- Check the speed sensor is correctly located in the hub of the motor end plate.
    - Check that the speed sensor loom plug is correctly fitted on the N-G1/hi terminal marked "TACHO".
        - Check the loom and the connection plug are not damaged.
            - Remove speed sensor from motor end plate and check;
                - That no foreign matter has entered the sensor cap.
                - The sensor PCB is firmly secured within the sensor cap.
                - The 2 sensor probes on the PCB are vertically aligned.
                - The wiring circuit is not damaged.

N-G1/lo Error Codes Test Procedures (cont.)

Earth Continuity Test