



SAS E3 – Invertor Control

Basic Set-up & Connections



Unit 3 Hawksworth, Didcot, OX11 7HR, England, UK

Tel: 00 44 1865 747 634

Fax: 00 44 8701 602 755

info@spiceapplications.com

www.spiceapplications.com

INDEX

<u>DESCRIPTION OF INFORMATION</u>	<u>PAGE NUMBERS</u>
WARNINGS OVERVIEW.....	2
DECLARATION OF CONFORMITY FOR MACHINERY.....	3
PRODUCT INTRODUCTION.....	4-5
INSTALLATION.....	6-14
OPERATING PRINCIPLE.....	15
START UP.....	16-17
CLEANING.....	18
TROUBLESHOOTING.....	19
DIMENSIONS.....	20
TECHNICAL SPECIFICATIONS.....	21
WARRANTY.....	22

IMPORTANT

This manual is for basic connection information and as a Quick Start guide only, relevant to the SAS equipment installations.

The content of this manual consists mainly of abridged excerpts from the original Invertek Used Guide manuals for the models referred to within.

This manual MUST be read in conjunction with the relevant Invertek User Guide, which are obtainable upon the Invertek Limited web site:
www.invertekdrives.com

The Invertek manuals used in the content of this manual are as follows:

Optidrive E3 IP66 Indoor Model – Version 2.00
Optidrive E3 IP66 Outdoor Model – Version 1.21

To obtain the best performance and reliability from this equipment it is strongly recommended to read the Invertek instruction manual thoroughly before attempting to use the equipment.

Spice Application Systems do not accept any responsibility for any misinterpretation or non fulfilment of the above mentioned instructions.

WARNINGS OVERVIEW

SAFETY GUIDELINES



The person in charge of the manufacturing work area should ensure that personnel are properly trained in the use of this equipment. The safety rules which follow should be fully understood and applied at all times.



For more information, consult the local safety rules. In addition, the following precautions must be observed.

WARNING! Failure to observe the safety precautions contained within the associated **Invertek Limited** manual could result in operational difficulties of the equipment and potential to create unsafe conditions.



The removing of the protective equipment and/ or modifying the machine without previous authorization by the manufacturer is strictly forbidden.

- Use only spare parts, accessories or materials that are original or instead item and materials provided by the manufacturer.
- Do not put or approach the hands and/or other objects near the movement blocks in order to avoid crushing risks.
- The installation and even the partial use of the equipment are forbidden to the unauthorized operators.
- It is compulsory the grounding of the metallic box.
- Any use of the equipment different from the intended one is strictly forbidden.
- Read carefully the warning and danger plates on the equipment.
- It is forbidden to remove the warning and danger plates on the equipment.
- It is forbidden to start up the equipment before the installation is declared compliant to the directive 2004/108/EC.
- The installer has to provide the suitable devices for the products that are dangerous and harmful by contact and/or by inhalation, flammable, explosive and dangerous from a bacterial and/or viral point of view. Concerning this part the installer has to set up all the protections in order to avoid damages to things or people if breakings with consequent fall of pieces from the equipment occurs.
- Do not start the machine without having the complete knowledge about the functioning.
- Do not clean, make maintenance, substitute or adjust machine components if the voltage is on.
- The people responsible for the use of the machine have to check and provide the correct use of the equipment according to the requests, the regulations, the laws and the European community Standards.

DECLARATION OF CONFORMITY

Invertek Compliance Documents

Invertek Drives Ltd hereby states that the Optidrive ODE-3 product range conforms to the relevant safety provisions of the following council directives:

2014/30/EU (EMC) and 2014/35/EU (LVD)

Designed and manufacture is in accordance with the following harmonised European standards:

EN 61800-5-1: 2007	Adjustable speed electrical power drive systems. Safety requirements. Electrical, thermal and energy.
EN 61800-3: 2004 /A1 2012	Adjustable speed electrical power drive systems. EMC requirements and specific test methods
EN 55011: 2007	Limits and Methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment (EMC)
EN60529: 1992	Specifications for degrees of protection provided by enclosures

Electromagnetic Compatibility

All Optidrive are designed with high standards of EMC in mind. All versions suitable for operation on Single Phase 230 volt and Three Phase 400 volt supplies and intended for use within the European Union are fitted with an internal EMC filter. This EMC filter is designed to reduce the conducted emissions back into the mains supply via the power cables for compliance with the above harmonised European standards.

It is the responsibility of the installer to ensure that the equipment or system into which the product is incorporated complies with the EMC legislation of the country of use, and the relevant category. Within the European Union, equipment into which this product is incorporated must comply with the EMC Directive 2004/108/EC. This User Guide provides guidance to ensure that the applicable standards may be achieved.

Additional Information for UL Compliance

Optidrive E3 is designed to meet the UL requirements. For an up to date list of UL compliant products, please refer to UL listing NMMS.E226333. In order to ensure full compliance, the following must be fully observed.

Input Power Supply Requirements				
Supply Voltage	200 – 240 RMS Volts for 230 Volt rated units, +/- 10% variation allowed. 240 Volt RMS Maximum.			
	380 – 480 Volts for 400 Volt rated units, +/- 10% variation allowed, Maximum 500 Volts RMS.			
Imbalance	Maximum 3% voltage variation between phase – phase voltages allowed.			
	All Optidrive E3 units have phase imbalance monitoring. A phase imbalance of > 3% will result in the drive tripping. For input supplies which have supply imbalance greater than 3% (typically the Indian sub-continent & parts of Asia Pacific including China) Invertek Drives recommends the installation of input line reactors.			
Frequency	50 – 60Hz +/- 5% Variation			
Short Circuit Capacity	Voltage Rating	Min kW (HP)	Max kW (HP)	Maximum supply short-circuit current
	115V	0.37 (0.5)	1.1 (1.5)	100kA rms (AC)
	230V	0.37 (0.5)	11 (15)	100kA rms (AC)
	400 / 460V	0.75 (1)	22 (30)	100kA rms (AC)
	All the drives in the above table are suitable for use on a circuit capable of delivering not more than the above specified maximum short-circuit Amperes symmetrical with the specified maximum supply voltage when protected by Class J fuses.			
Mechanical Installation Requirements				
All Optidrive E3 units are intended for installation within controlled environments which meet the condition limits shown in section 10.1. Environmental.				
The drive can be operated within an ambient temperature range as stated in section 10.1. Environmental.				
For IP66 (Nema 4X) units, installation in a pollution degree 2 environment is permissible.				
Electrical Installation Requirements				
Incoming power supply connection must be according to section 4.4. Incoming Power Connection.				
Suitable Power and motor cables should be selected according to the data shown in section 10.2. Rating Tables and the National Electrical Code or other applicable local codes.				
Motor Cable	75°C Copper must be used.			
Power cable connections and tightening torques are shown in section 3.3. Mechanical Dimensions – IP66 (Nema 4X) Enclosed Units.				
Integral Solid State short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the national electrical code and any additional local codes. Ratings are shown in section 10.2. Rating Tables.				
Transient surge suppression must be installed on the line side of this equipment and shall be rated 480Volt (phase to ground), 480 Volt (phase to phase), suitable for over voltage category iii and shall provide protection for a rated impulse withstand voltage peak of 4kV.				
UL Listed ring terminals / lugs must be used for all bus bar and grounding connections.				
General Requirements				
Optidrive E3 provides motor overload protection in accordance with the National Electrical Code (US).				
- Where a motor thermistor is not fitted, or not utilised, Thermal Overload Memory Retention must be enabled by setting P-50 = 1. - Where a motor thermistor is fitted and connected to the drive, connection must be carried out according to the information shown in section 4.11.2. Motor Thermistor Connection				

PRODUCT INTRODUCTION

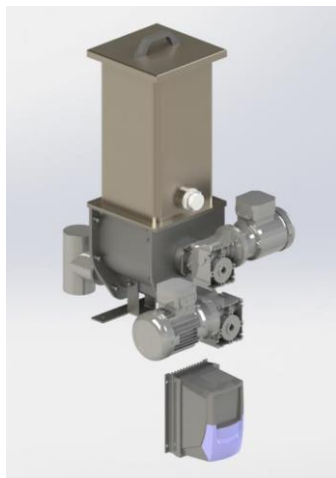
AC Variable Speed Drive Type: SAS E3 Invertor Control

The SAS E3 AC variable invertor drive is the motor speed controller used within our SAS coating system products.

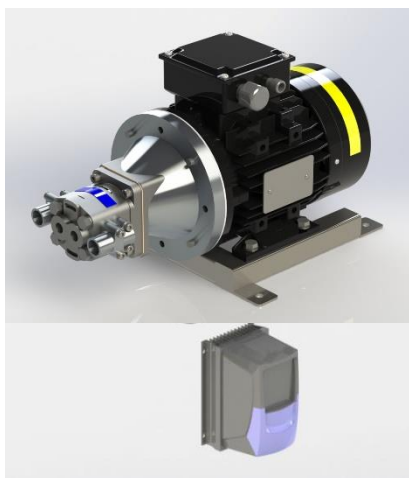
We standardise upon two IP66 Optidrive models, as manufactured and supplied by Inverterk Drives Limited.

SAS utilise these drives on the following equipment assemblies:-

- **SAS 1SF** – Twin Screw Feeder assemblies
- **SAS 1OP** – Oil Delivery Pump assemblies
- **SAS 1DR** – Coating Drum assemblies



SAS 1SF
Twin Screw Feeder
(1.5Kw)



SAS 1OP
Oil Pump
(1.5Kw)



SAS 1DR
Coating Drum
(0.75Kw)

Fig 1

Product Identification

<u>SAS Product</u>	<u>Description</u>	<u>Inverterk E3 Model No.</u>	
		Indoor Version	Outdoor Version
SAS-1SF-XXX	SAS Twin Screw Feeder	ODE-3-120070-1F1Y	ODE-3-120070-1F1B
SAS-1OP-XXX	SAS Oil Delivery Pump	ODE-3-120070-1F1Y	ODE-3-120070-1F1B
SAS-1DR-XXX	SAS Coating Drum	ODE-3-120043-1F1Y	ODE-3-120043-1F1B

PRODUCT INTRODUCTION



Indoor Version

Outdoor Version

Fig 2

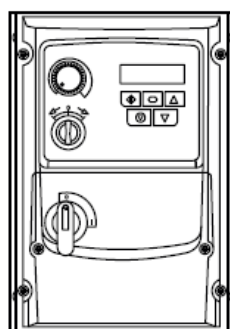
SAS E3 – Inverter Drive

Description	Inverter Model Number	SAS Part Number
E3 IP66 Indoor Version (1.5Kw)	ODE-3-120070-1F1Y	E3-100-177-IN
E3 IP66 Indoor Version (0.75Kw)	ODE-3-120043-1F1Y	E3-100-282-IN
E3 IP66 Outdoor Version (1.5Kw)	ODE-3-120070-1F1B	E3-100-177-OUT
E3 IP66 Outdoor Version (0.75Kw)	ODE-3-120043-1F1B	E3-100-282-OUT

Understanding the Rating Label

The product rating label provides the following information

	Key
1	Model Code
2	Enclosure Type and IP Rating
3	Firmware Version
4	Serial Number
5	Technical Data – Supply Voltage
6	Technical Data – Maximum continuous output current



On right hand side when viewed from the front.

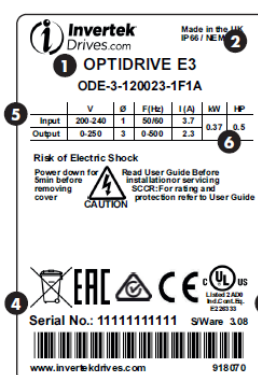


Fig 3

INSTALLATION

The following information is in regard to the wiring connections utilised for specific SAS product installations only.

For full and complete Installation instructions, please refer to the relevant Invertek User Guide, which are obtainable upon the Invertek Limited web site:

www.invertekdrives.com

The Invertek manuals used in the content of this manual are as follows:

Optidrive E3 IP66 Indoor Model – Version 2.00

Optidrive E3 IP66 Outdoor Model – Version 1.21

The user must have an installation area that satisfies the current regulations on health and safety on production environments.

Set up an area where install the machine verifying that the floor is flattened and without obstacles.

Make room around the machine sufficiently to permit safety and ergonomics to the operators and to the fitters. Safety distances from other machines or production areas must be observed according to the current regulations.

The installation and working area must be correctly lit up, defined and signalled. It must respect the law parameters concerning working areas.

The working area must be forbidden to personnel not involved in the machine operation. If this is not possible, barriers or similar means not hindering the production must be installed



WARNING: The set-up of the machine is usually performed by the manufacturer who knows the right methods to do it. In case that the set up cannot be performed by the manufacturer, the customer has to ask the manufacturer all the information in order to perform it correctly by himself.

INSTALLATION

ELECTRICAL CONNECTIONS

(Please also refer to the Invertek Manual)



The electric connection of the equipment must be performed only by qualified personnel, according to the current directives.



Before connecting the power, please check with a voltmeter that the phase of the line correspond to the one of the equipment. The power needed is written on the identification plate and on the engine plate.

- Check the presence and the functioning of the grounding system in power supply.
- Check that the main switch at the beginning of the equipment power line is in "0" position.
- Check the rotation direction of the engine.
- Always pay attention to the safety requirements.

CONNECTIONS LOCATIONS

Single phase supply

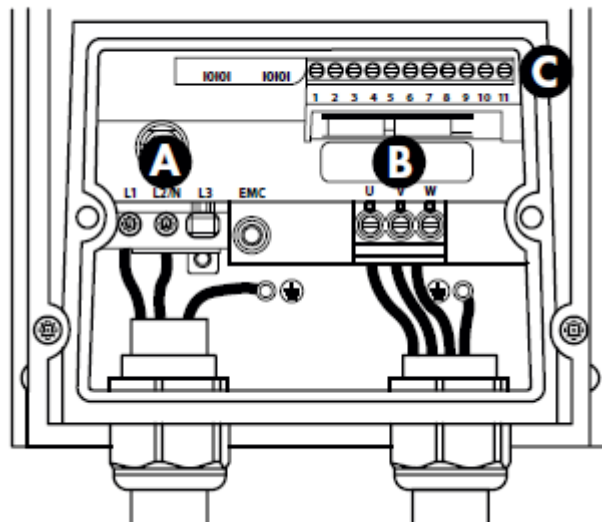


Fig 4

Position	Description	Manual Reference
A	Incoming Power	See Pages 8-9, Fig 5
B	Motor Connections	See Pages 10-13, Fig 6 to Fig 9
C	Control Terminal Connections	See Page 14, Fig 10

INSTALLATION

POWER CONNECTIONS

PROTECTIVE EARTH (PE) CONNECTION

Grounding Guidelines

The ground terminal of each Optidrive should be individually connected DIRECTLY to the site ground bus bar (through the filter if installed).

Optidrive ground connections should not loop from one drive to another, or to, or from any other equipment. Ground loop impedance must conform to local industrial safety regulations. To meet UL regulations, UL approved ring crimp terminals should be used for all ground wiring connections.

The drive Safety Ground must be connected to system ground.

Ground impedance must conform to the requirements of national and local industrial safety regulations and/or electrical codes.

The integrity of all ground connections should be checked periodically.

Protective Earth Conductor

The Cross sectional area of the PE Conductor must be at least equal to that of the incoming supply conductor.

Safety Ground

This is the safety ground for the drive that is required by code. One of these points must be connected to adjacent building steel (girder, joist), a floor ground rod, or bus bar. Grounding points must comply with national and local industrial safety regulations and/or electrical codes.

Motor Ground

The motor ground must be connected to one of the ground terminals on the drive.

Ground Fault Monitoring

As with all inverters, a leakage current to earth can exist. The Optidrive is designed to produce the minimum possible leakage current whilst complying with worldwide standards.

The level of current is affected by motor cable length and type, the effective switching frequency, the earth connections used and the type of RFI filter installed. If an ELCB (Earth Leakage Circuit Breaker) is to be used, the following conditions apply:

- A Type B Device must be used.
- The device must be suitable for protecting equipment with a DC component in the leakage current.
- Individual ELCBs should be used for each Optidrive.

INSTALLATION

Shield Termination (Cable Screen)

The safety ground terminal provides a grounding point for the motor cable shield. The motor cable shield connected to this terminal (drive end) should also be connected to the motor frame (motor end). Use a shield terminating or EMI clamp to connect the shield to the safety ground terminal.

INCOMING POWER CONNECTION

Cable Selection

- For 1 phase supply, the mains power cables should be connected to L1/L, L2/N.
- For compliance with CE EMC requirements, **refer to the Invertek manual for EMC Compliant Installation.**
- A fixed installation is required according to IEC61800-5-1 with a suitable disconnecting device installed between the Optidrive and the AC Power Source. The disconnecting device must conform to the local safety code / regulations (e.g. within Europe, EN60204-1, Safety of machinery).
- The cables should be dimensioned according to any local codes or regulations. **Maximum dimensions are provided within the Invertek manual given Rating Tables.**

Fuse / Circuit Breaker Selection

- Suitable fuses to provide wiring protection of the input power cable should be installed in the incoming supply line (**refer to Invertek Manual for the Rating Tables**). The fuses must comply with any local codes or regulations in place. In general, type Gg (IEC 60269) or UL type J fuses are suitable; however in some cases type aR fuses may be required. The operating time of the fuses must be below 0.5 seconds.
- Where allowed by local regulations, suitably dimensioned type B MCB circuit breakers of equivalent rating may be utilised in place of fuses, providing that the clearing capacity is sufficient for the installation.
- The maximum permissible short circuit current at the Optidrive Power terminals as defined in IEC60439-1 is 100kA.

200-240V - Single Phase Input

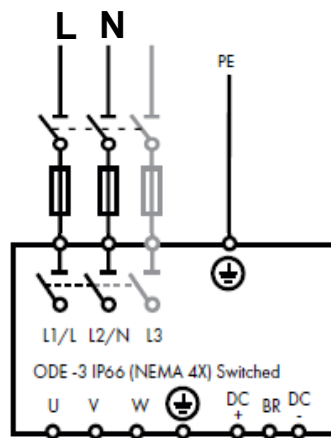


Fig 5

INSTALLATION

MOTOR CONNECTION

Motor Connection

- The drive inherently produces fast switching of the output voltage (PWM) to the motor compared to the mains supply. For motors which have been wound for operation with a variable speed drive additional measures are not required; however if the quality of insulation is unknown the motor manufacturer should be consulted and preventative measures may be required.
- The motor should be connected to the Optidrive U, V, and W terminals using a suitable 3 or 4 core cable. Where a 3 core cable is utilised, with the shield operating as an earth conductor, the shield must have a cross sectional area at least equal to the phase conductors when they are made from the same material. Where a 4 core cable is utilised, the earth conductor must be of at least equal cross sectional area and manufactured from the same material as the phase conductors.
- The motor earth must be connected to one of the Optidrive earth terminals.
- Maximum permitted motor cable length for all models: 100 metres shielded, 150 metres unshielded.
- Where multiple motors are connected to a single drive using parallel cables, an output choke **must** be installed.

Motor Terminal Box Connections

Do not install any mechanical or electro-mechanical switching devices between the drive and motor.

Where a local isolator is installed close to the motor, this should be interlocked with the drive control circuit to ensure the drive is disabled when the motor is isolated.

Most general purpose motors are wound for operation on dual voltage supplies.

This is indicated on the nameplate of the motor.

This operational voltage is normally selected when installing the motor by selecting either STAR or DELTA connection.

For SAS Equipment installations, please wire in DELTA

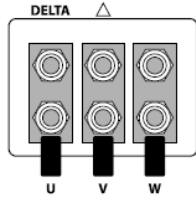
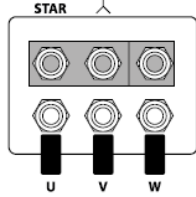
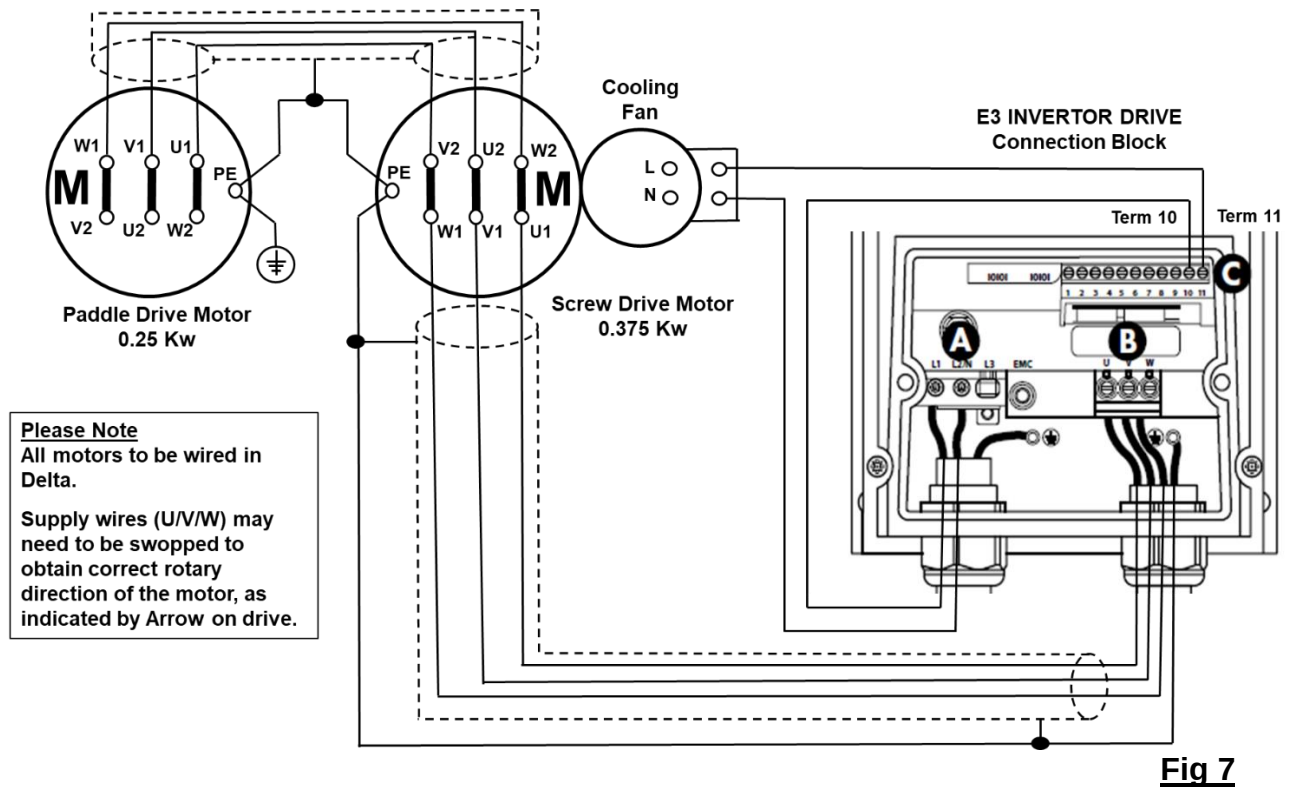
Incoming Supply Voltage	Motor Nameplate Voltages	Connection	
230	230 / 400	Delta	
400	400 / 690		
400	230 / 400	Star	

Fig 6

INSTALLATION

SAS 1SF - MOTOR CONNECTIONS



PARAMETER SETTINGS – SCREW FEEDER

Terminal Mode

- P 12 = 0 (Responds to commands applied directly to the control terminals)
- P 15 = 5 (Allows Forward direction only)

INSTALLATION

SAS 10P - MOTOR CONNECTIONS

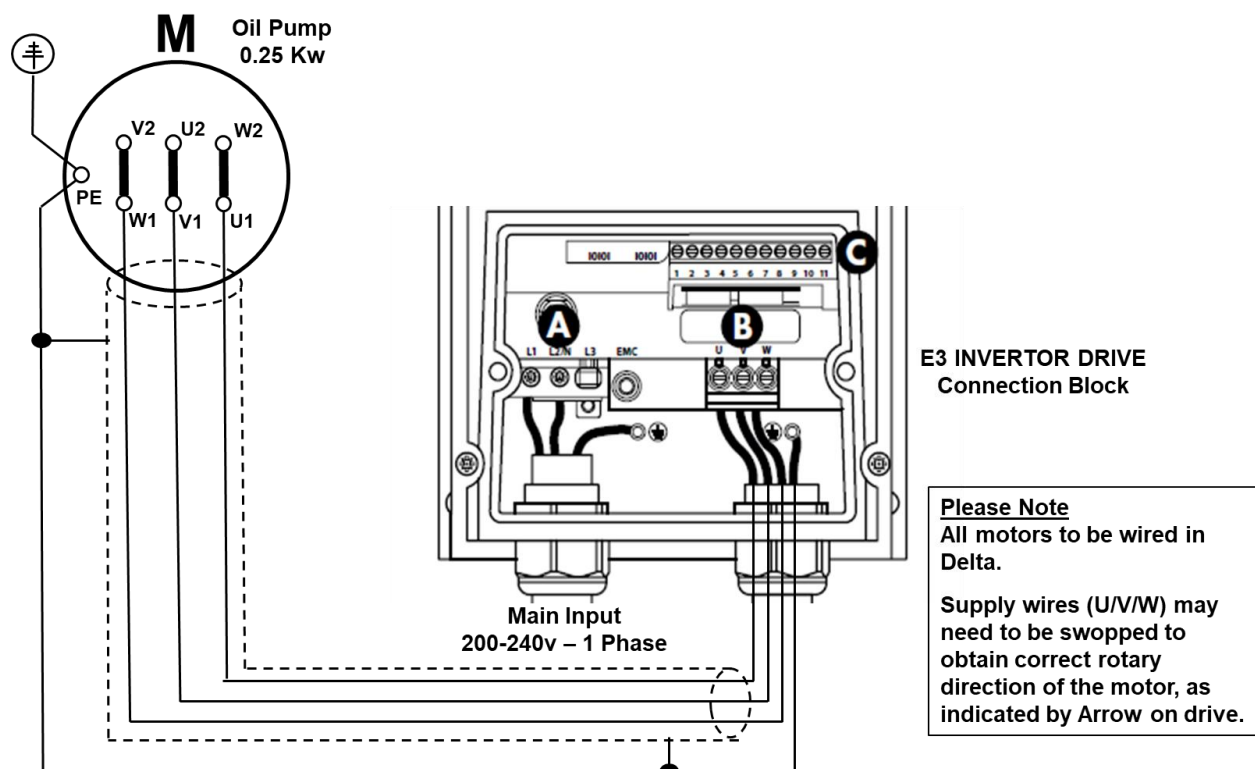


Fig 8

PARAMETER SETTINGS – OIL PUMP

Terminal Mode (Factory Settings)

- P 12 = 0 (Responds to commands applied directly to the control terminals)
- P 15 = 0 (Allows Forward & Reverse direction)

INSTALLATION

SAS 1DR - MOTOR CONNECTIONS

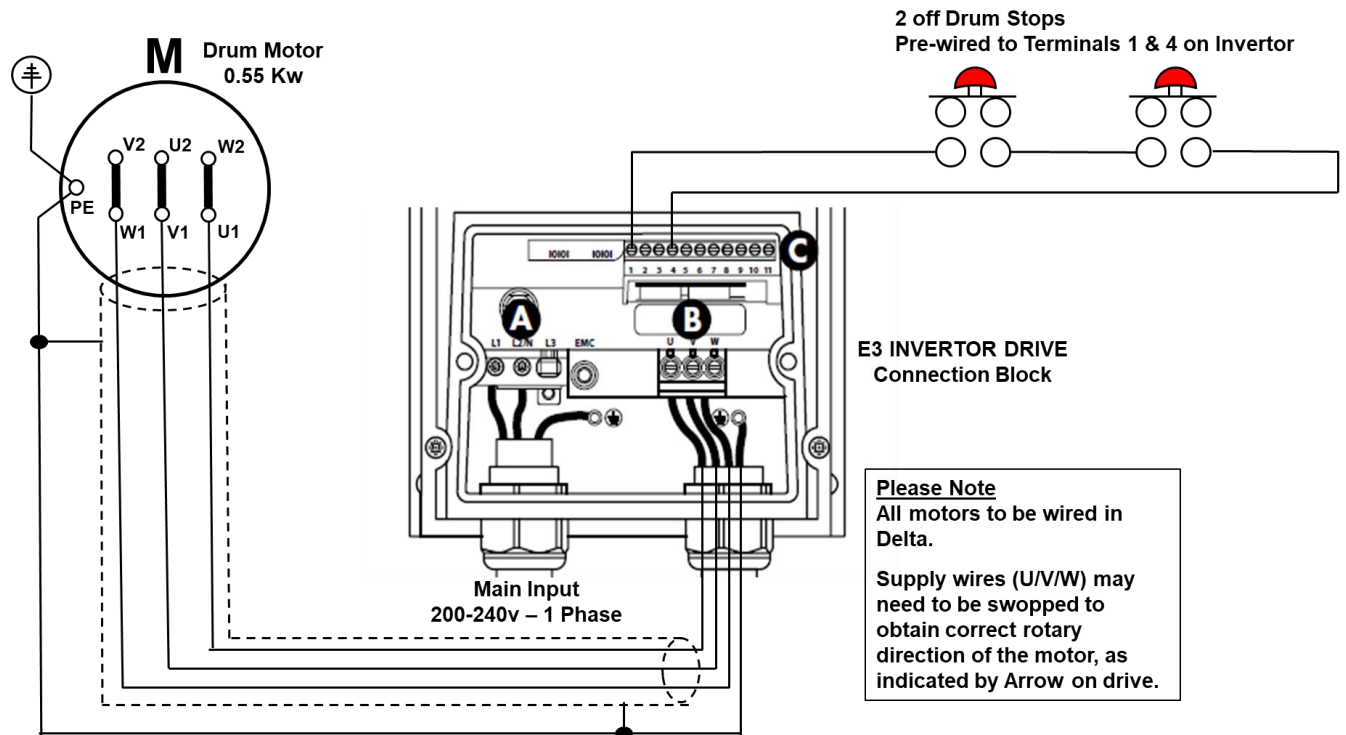


Fig 9

PARAMETER SETTINGS – COATING DRUM

Terminal Mode

- P 12 = 0 (Responds to commands applied directly to the control terminals)
- P 15 = 6 (Allows Forward & Reverse of Drum rotation)



Please Note

If Drum Stop CCT is engaged, the following reset procedure must be followed:-

- Ensure both Drum Stop CCT buttons are reset.
- Select the “OFF” position on the E3 Invertor switch.
- Then select the desired direction of rotation (Forward or Reverse).

INSTALLATION

CONTROL TERMINAL CONNECTIONS

Default Connections	Control Terminal	Signal	Description
	1	+24Vdc User Output	+24Vdc user output, 100mA. Do not connect an external voltage source to this terminal.
	2	Digital Input 1	Positive logic
	3	Digital Input 2	"Logic 1" input voltage range: 8V ... 30V DC "Logic 0" input voltage range: 0V ... 4V DC
	4	Digital Input 3 / Analog Input 2	Digital: 8 to 30V Analog: 0 to 10V, 0 to 20mA or 4 to 20mA
	5	+10V User Output	+10V, 10mA, 1 kΩ minimum
	6	Analog Input 1 / Digital Input 4	Analog: 0 to 10V, 0 to 20mA or 4 to 20mA Digital: 8 to 30V
	7	0V	0 Volt Common, internally connected to terminal 9
	8	Analog Output / Digital Output	Analog: 0 to 10V, Digital: 0 to 24V
	9	0V	0 Volt Common, internally connected to terminal 7
	10	Relay Common	
	11	Relay NO Contact	Contact 250Vac, 6A / 30Vdc, 5A

Fig 10

Control Terminal Wiring

- All analogue signal cables should be suitably shielded. Twisted pair cables are recommended.
- Power and Control Signal cables should be routed separately where possible and must not be routed parallel to each other.
- Signal levels of different voltages e.g. 24 Volt DC and 110 Volt AC, should not be routed in the same cable.
- Maximum control terminal tightening torque is 0.5Nm.
- Control Cable entry conductor size: 0.05 – 2.5mm² / 30 – 12 AWG.

IMPORTANT

This manual is for basic connection information Only.

This manual MUST be read in conjunction with the relevant Invertek User Guide, which are obtainable upon the Invertek Limited web site:
www.invertekdrives.com

The Invertek manuals used in the content of this manual are as follows:

Optidrive E3 IP66 Indoor Model – Version 2.00
Optidrive E3 IP66 Outdoor Model – Version 1.21

Spice Application Systems do not accept any responsibility for any misinterpretation or non fulfilment of the above mentioned instructions.

OPERATING PRINCIPLE

E3 INVERTOR DRIVE

MANAGING THE KEYPAD

The drive is configured and its operation monitored via the keypad and display.

	NAVIGATE	Used to display real-time information, to access and exit parameter edit mode and to store parameter changes.
	UP	Used to increase speed in real-time mode or to increase parameter values in parameter edit mode.
	DOWN	Used to decrease speed in real-time mode or to decrease parameter values in parameter edit mode.
	RESET / STOP	Used to reset a tripped drive. When in Keypad mode is used to Stop a running drive.
	START	When in keypad mode, used to Start a stopped drive or to reverse the direction of rotation if bi-directional keypad mode is enabled.

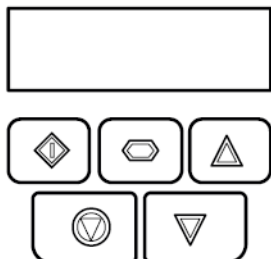


Fig 11

OPERATING DISPLAYS

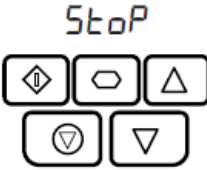
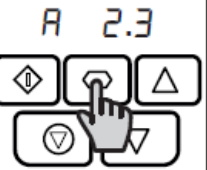
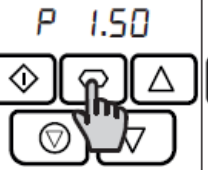
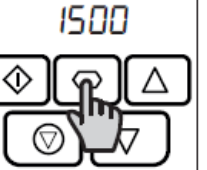
				
Drive Stopped / Disabled	Drive is enabled / running, display shows the output frequency (Hz)	Press the Navigate key for < 1 second. The display will show the motor current (Amps)	Press the Navigate key for < 1 second. The display will show the motor power (kW)	If P-10 > 0, pressing the Navigate key for < 1 second will display the motor speed (RPM)

Fig 12

Please Note

For all other detailed information of Parameter settings, Analog and Digital Input functions, Modbus communications, etc. please refer to the relevant Invertek Manual.

START UP

E3 INVERTOR DRIVE

- Check that during the transport any damage to the structure or internal parts of the equipment has not occurred.
- Check that the power supplied is compliant to the machine one.
- Check the presence and integrity of the danger and warning signs.
- Check if water or external substances have entered the equipment. If so take away the cover, clean the equipment and reassemble.
- Check the rotation direction of the drive. If it is not correct invert the connection on the engine.
- Check the right level of the oil in the motor gear.
- Check that the warning signs on the machine is in good conditions.
- Check the correct machine fastening and its stability.
- Check the correct functioning of the auxiliary equipment.
- Check the integrity and correct functioning of all guards and protective devices. The transport or the installation might damage or misadjust them.
- Check the working temperature of the different components: they do not have to overheat.
- The first start up test must be done with the process empty for about thirty minutes, if any noise, vibrations or other things that may suggest a bad functioning don't occur then the loading with other material can be done.
- After the first 12 hours of the working cycle check the tightness of the bolts.



It is absolutely forbidden to work inside the equipment while it is functioning. It is absolutely forbidden to open the inlet and outlet ports and the covers with the electrical power On.



WARNING: It is absolutely forbidden to take off the safety guards during the equipment functioning.

Remove the safety guards only after switching off the power supply.

This operation is allowed only to technical qualified personnel.



WARNING: it is compulsory to isolate any energy supply of the line anytime the maintenance and adjusting operations are performed.

Before starting the equipment, by turning the main switch on the ON position, it is necessary to:



Nobody is nearby the equipment.

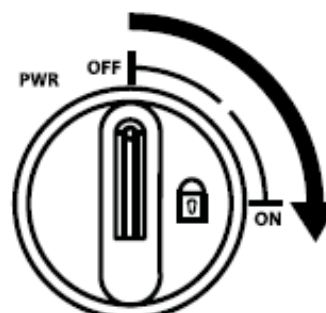
- The safety devices are present and functioning.
- The safety guards are completely closed.

START UP

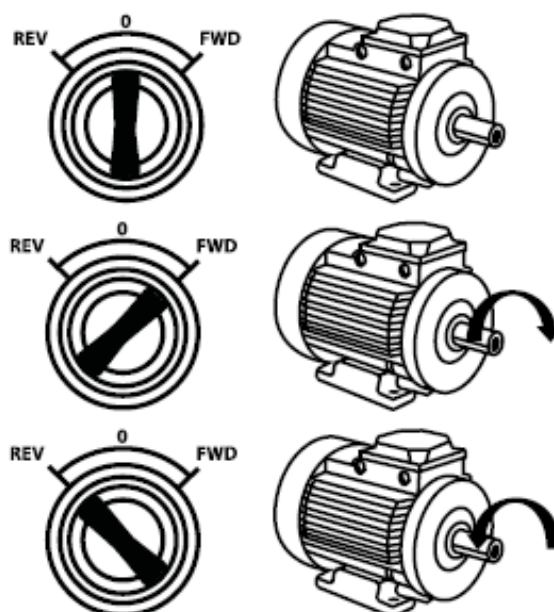
E3 INVERTOR DRIVE

QUICK START

Switch the mains power on to the unit using the built in isolator switch on the front panel.



The OFF/REV/FWD will enable the output and control the direction of rotation of the motor.



The potentiometer will control the motor shaft rotational speed.

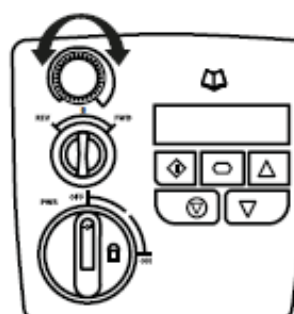


Fig 13

CLEANING METHOD

CLEANING OF THE EQUIPMENT

With the machine turned off and disconnected from the power line, use a dry and clean cloth to clean the exterior of the machine, if necessary soaked with a suitable non-toxic and non-abrasive detergent.



Do not wash the machine with a high pressure water jet around the electric motor.

- The ON/OFF switches on the power supply and to the equipment must be OFF position before starting cleaning operation.
- Wait for 30 seconds before entering the spray area.
- Wash thoroughly and dry completely with low pressure compressed air at 2 bar (29psi)
- Wipe dry the equipment, plus all hoses and cables carefully and thoroughly, before commencing production.



THIS IS VERY IMPORTANT.
IF NOT DRY IT CAN LEAD TO MATERIAL BUILD UP ON THE EQUIPMENT.

Before switching the electrostatic back ON, please check:

1. Check that the equipment plus all hoses and cables are completely dry.
2. Check that all equipment within the application area is correctly installed and positioned.

TROUBLESHOOTING

FAULT CODE MESSAGES

Fault Code	No.	Description	Suggested Remedy
no-Fault	00	No Fault	Not required.
Ol-b	01	Brake channel over current	Check external brake resistor condition and connection wiring.
OL-br	02	Brake resistor overload	The drive has tripped to prevent damage to the brake resistor.
O-I	03	Output Over Current	Instantaneous Over current on the drive output. Excess load or shock load on the motor. NOTE Following a trip, the drive cannot be immediately reset. A delay time is inbuilt, which allows the power components of the drive time to recover to avoid damage.
I-terP	04	Motor Thermal Overload (I2t)	The drive has tripped after delivering >100% of value in P-08 for a period of time to prevent damage to the motor.
PS-terP	05	Power stage trip	Check for short circuits on the motor and connection cable
O-volt	06	Over voltage on DC bus	Check the supply voltage is within the allowed tolerance for the drive. If the fault occurs on deceleration or stopping, increase the deceleration time in P-04 or install a suitable brake resistor and activate the dynamic braking function with P-34.
U-volt	07	Under voltage on DC bus	The incoming supply voltage is too low. This trip occurs routinely when power is removed from the drive. If it occurs during running, check the incoming power supply voltage and all components in the power feed line to the drive.
O-t	08	Heatsink over temperature	The drive is too hot. Check the ambient temperature around the drive is within the drive specification. Ensure sufficient cooling air is free to circulate around the drive.
U-t	09	Under temperature	Trip occurs when ambient temperature is less than -10°C. Temperature must be raised over -10°C in order to start the drive.
P-def	10	Factory Default parameters loaded	
E-terP	11	External trip	E-trip requested on digital input 3. Normally closed contact has opened for some reason. If motor thermistor is connected check if the motor is too hot.
SC-Ob5	12	Optibus comms loss	Check communication link between drive and external devices. Make sure each drive in the network has its unique address.
FLt-dc	13	DC bus ripple too high	Check incoming supply phases are all present and balanced.
P-L055	14	Input phase loss trip	Check incoming power supply phases are present and balanced.
h O-I	15	Output Over Current	Check for short circuits on the motor and connection cable. Note: Following a trip, the drive cannot be immediately reset. A delay time is inbuilt, which allows the power components of the drive time to recover to avoid damage.
th-FLt	16	Faulty thermistor on heatsink	
dRtR-F	17	Internal memory fault (IO)	Press the stop key. If the fault persists, consult your supplier.
4-20 F	18	4-20mA Signal Lost	Check the analog input connection(s).
dRtR-E	19	Internal memory fault (DSP)	Press the stop key. If the fault persists, consult your supplier.
F-Ptc	21	Motor PTC thermistor trip	Connected motor thermistor over temperature, check wiring connections and motor.
FAn-F	22	Cooling Fan Fault (IP66 only)	Check / replace the cooling fan.
O-HERt	23	Drive internal temperature too high	Drive ambient temperature too high, check adequate cooling air is provided.
OUE-F	26	Output Fault	Indicates a fault on the output of the drive, such as one phase missing, motor phase currents not balanced. Check the motor and connections.
AtF-O1	40	Autotune Fault	The motor parameters measured through the autotune are not correct.
AtF-O2	41		Check the motor cable and connections for continuity.
AtF-O3	42		Check all three phases of the motor are present and balanced.
AtF-O4	43		
AtF-O5	44		
SC-FD1	50	Modbus comms loss fault	Check the incoming Modbus RTU connection cable. Check that at least one register is being polled cyclically within the timeout limit set in P-36 Index 3.
SC-FD2	51	CAN comms loss trip	Check the incoming CAN connection cable. Check that cyclic communications take place within the timeout limit set in P-36 Index 3.

NOTE Following an over current or overload trip (3, 4, 5, 15) the drive may not be reset until the reset time delay has elapsed to prevent damage to the drive.

DIMENSIONS

E3 INVERTOR DRIVE - IP66 Outdoor

SAS Part Number: E3-100-177-OUT (1.5Kw)
 E3-100-282-OUT (0.75Kw)

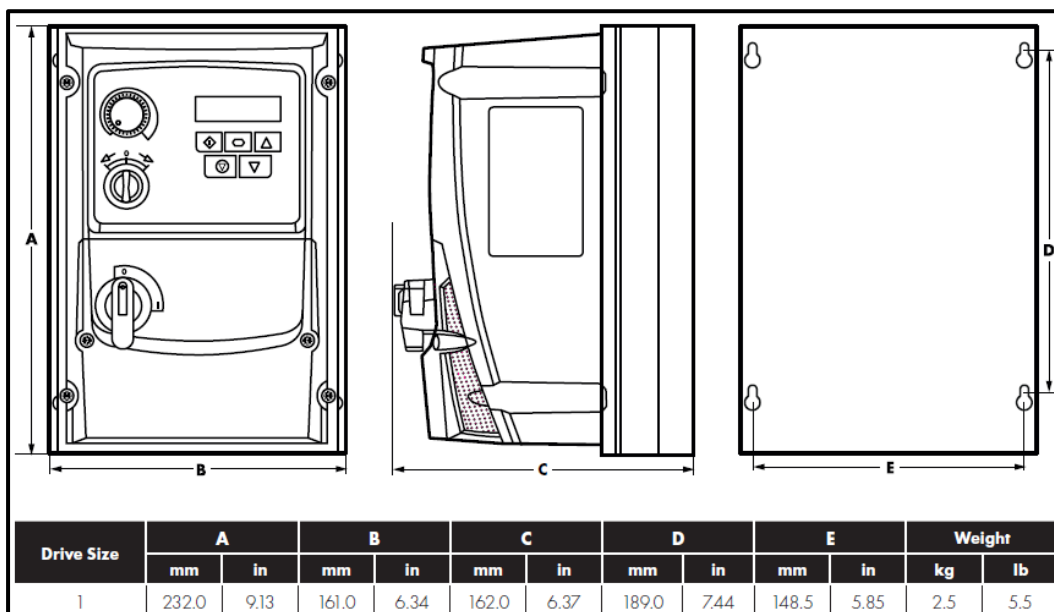


Fig 14

E3 INVERTOR DRIVE - IP66 Indoor

SAS Part Number: E3-100-177-IN (1.5Kw)
 E3-100-282-IN (0.75Kw)

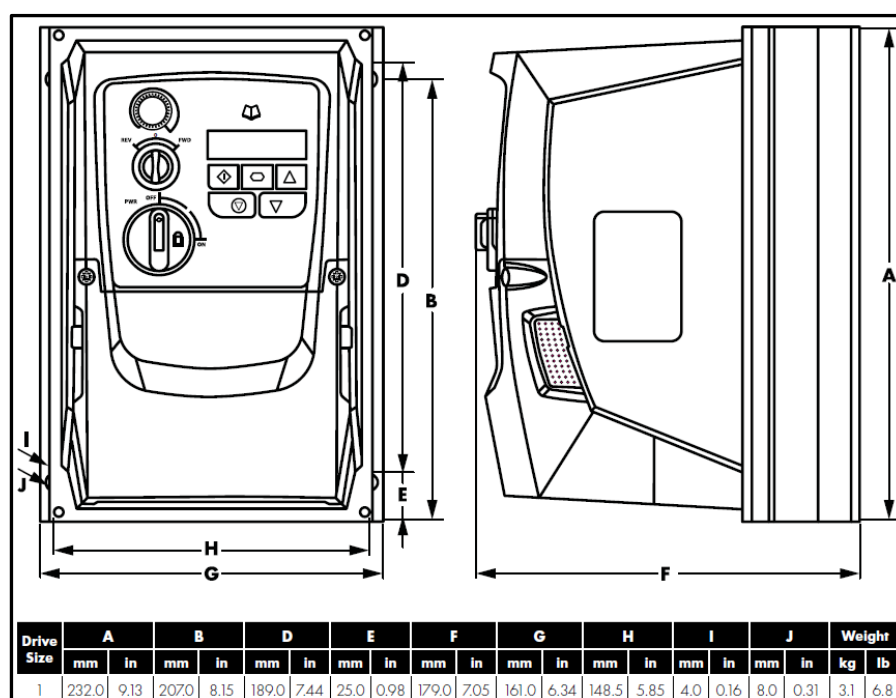


Fig 15

TECHNICAL SPECIFICATIONS

E3 INVERTOR DRIVE – IP66 (Indoor & Outdoor)

Operational ambient temperature range : -10 ... 40°C (frost and condensation free)
 Storage ambient temperature range : -40 ... 60°C
 Maximum altitude : 2000m. De-rate above 1000m: 2.5% / 100m
 Maximum humidity : 95%, non-condensing

Rating Tables

Frame Size	kW	HP	Input Current	Fuse / MCB (Type B)		Maximum Cable Size		Output Current	Recommended Brake Resistance
				Non UL	UL	mm	AWG		
200 - 240 (+ / - 10%) V 1 Phase Input, 3 Phase Output									
1	0.37	0.5	3.7	10	6	8	8	2.3	-
1	0.75	1	7.5	10	10	8	8	4.3	-
1	1.5	2	12.9	16	17.5	8	8	7	-

NOTE

Cables sizes shown are the maximum possible that may be connected to the drive. Cables should be selected according to local wiring codes or regulations at point of installation.

WARRANTY

Dear Customer,

Thank you for buying a SAS products and systems. Every care has been taken, from design to manufacture, to ensure that this product gives you complete satisfaction.

Spice Application Systems Ltd guarantees that all equipment manufactured by them will be free from defective workmanship or materials for a period of 12 months or 3000 working hours, from the date of delivery of the equipment, whichever comes first.

We will rectify any manufacturing or material defects by means of suitable repair or supplying a replacement part.

Always providing that:

- Any such defect(s) is reported in writing, within the 12-month period.
- All equipment is installed, operated and maintained in accordance with specific recommendations of Spice Application Systems Ltd and good industry practice.
- Spice Application Systems Ltd supplies all spare parts and consumable items.
- Consumable spares are inspected frequently and replaced as necessary. The life of these varies with the application and they are not guaranteed for any specific period.
- Maintenance spares are inspected and replaced if necessary every 12 months or 3000 operated hours, whichever is sooner.
- Any consequential loss, however caused is expressly excluded from this guarantee

Spice Application Systems Ltd will not be liable for any repairs or replacements (including labour costs) without our written approval.

Spice Application Systems Ltd gives no performance guarantees, unless specifically indicated in our proposal. The effects erosion, corrosion and general wear and tear are specifically excluded.

Spice Application Systems Ltd reserves the right to amend or change specifications, as part of their continuous development policy.

We make no other guarantee or representation whatsoever, expressed or implied.

Unit 3 Hawksworth, Didcot, OX11 7HR, England, UK

Tel: 00 44 1865 747 634

Fax: 00 44 8701 602 755

info@spiceapplications.com

www.spiceapplications.com