

Fenner®



Fenner® QD:VT



**Installation
and
Operating
Instructions**



Declaration of Conformity:

ERIKS Industrial Services Ltd hereby states that the QD:VT Plus product range is CE marked for the low voltage directive and conforms to the following harmonised European directives:

EN 61800-5-1: 2003	Adjustable speed electrical power drive systems. Safety requirements. Electrical, thermal and energy.
EN 61800-3 2 nd Ed: 2004	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

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All Fenner QD:VT units carry a 2 year warranty against manufacturing defects from the date of manufacture. The manufacturer accepts no liability for any damage caused during or resulting from transport, receipt of delivery, installation or commissioning. The manufacturer also accepts no liability for damage or consequences resulting from inappropriate, negligent or incorrect installation, incorrect adjustment of the operating parameters of the drive, incorrect matching of the drive to the motor, incorrect installation, unacceptable dust, moisture, corrosive substances, excessive vibration or ambient temperatures outside of the design specification.

The local distributor may offer different terms and conditions at their discretion, and in all cases concerning warranty, the local distributor should be contacted first.

The contents of this User Guide are believed to be correct at the time of printing. In the interest of a commitment to a policy of continuous improvement, the manufacturer reserves the right to change the specification of the product or its performance or the contents of the User Guide without notice.

This User Guide is for use with V3.00 Firmware.

User Guide Issue 3.00 11/08

ERIKS Industrial Services Ltd adopts a policy of continuous improvement and whilst every effort has been made to provide accurate and up to date information, the information contained in this User Guide should be used for guidance purposes only and does not form the part of any contract.

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1. Introduction

1.1. Important safety information

This variable speed drive product (QD:VT) is intended for professional incorporation into complete equipment or systems. If installed incorrectly it may present a safety hazard. The QD:VT uses high voltages and currents, carries a high level of stored electrical energy, and is used to control mechanical plant that may cause injury. Close attention is required to system design and electrical installation to avoid hazards in either normal operation or in the event of equipment malfunction.



System design, installation, commissioning and maintenance must be carried out only by personnel who have the necessary training and experience. They must carefully read this safety information and the instructions in this Guide and follow all information regarding transport, storage, installation and use of the QD:VT, including the specified environmental limitations.

Please read the IMPORTANT SAFETY INFORMATION below, and all Warning and Caution information elsewhere.

	<p>Indicates a potentially hazardous situation which, if not avoided, could result in injury or death.</p>		<p>Indicates a potentially hazardous situation which, if not avoided, could result in damage to property.</p>
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Safety of machinery, and safety-critical applications

The level of integrity offered by the QD:VT control functions – for example stop/start, forward/reverse and maximum speed, is not sufficient for use in safety-critical applications without independent channels of protection. All applications where malfunction could cause injury or loss of life must be subject to a risk assessment and further protection provided where needed. Within the European Union, all machinery in which this product is used must comply with Directive 89/392/EEC, Safety of Machinery. In particular, the electrical equipment should comply with EN60204-1.

	<p>QD:VT Drives should be installed only by qualified electrical persons and in accordance with local and national regulations and codes of practice. The QD:VT has an Ingress Protection rating of IP20. For higher IP ratings, use a suitable enclosure or the IP55 version if available.</p> <p>Electric shock hazard! Disconnect and ISOLATE the QD:VT before attempting any work on it. High voltages are present at the terminals and within the drive for up to 10 minutes after disconnection of the electrical supply.</p> <p>Where supply to the drive is through a plug and socket connector, do not disconnect until 10 minutes have elapsed after turning off the supply.</p> <p>Ensure correct earthing connections. The earth cable must be sufficient to carry the maximum supply fault current which normally will be limited by the fuses or MCB</p> <p>The STOP function does not remove potentially lethal high voltages. ISOLATE the drive and wait 10 minutes before commencing any work.</p> <p>Parameter P1-01 can be set to operate the motor at up to 120,000 rpm, hence use this parameter with care.</p> <p>If it is desired to operate the drive at any frequency/speed above the rated speed (P1-09/ P1-10) of the motor, consult the manufacturers of the motor and the driven machine about suitability for over-speed operation.</p> <p>The fan (if fitted) inside of the QD:VT starts automatically when the heat-sink temperature reaches approximately 45°C.</p>
	<p>Carefully inspect the QD:VT before installation to ensure it is undamaged</p> <p>This product is intended for Indoor Use Only.</p> <p>Flammable material should not be placed close to the drive</p> <p>The entry of conductive or flammable foreign bodies should be prevented</p> <p>Relative humidity must be less than 95% (non-condensing).</p> <p>Ensure that the supply voltage, frequency and number of phases (1 or 3) correspond to the rating of the drive as delivered.</p> <p>An isolator should be installed between the power supply and the drive.</p> <p>Never connect the mains power supply to the Output terminals U, V, W.</p> <p>Suitably rated fuses or MCB should be fitted in the mains supply to the drive.</p> <p>Do not install any type of automatic switchgear between the drive and the motor.</p> <p>Wherever control cabling is close to power cabling, maintain a minimum separation of 100 mm and arrange crossings at 90°.</p> <p>Ensure that all terminals are tightened to the appropriate torque setting</p>

1.2. Electromagnetic Compatibility (EMC)

QD:VT Drives are designed to high standards of EMC and are fitted with an internal EMC filter. This EMC filter is designed to reduce the conducted emissions back into the supply via the power cables for compliance with 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. Within the EU, equipment must comply with 89/336/EEC, EMC.

All QD:VT Drives are intended for professional installation by qualified or experienced personnel.

2. General Information and Ratings

2.1. Drive model numbers

Fenner Part Number	kW	HP	Output Current (A)	Frame Size
572H21P5	1.5	2	7	2
572H22P2	2.2	3	10.5	2
Fenner Part Number	kW	HP	Output Current (A)	Frame Size
572H31P5	1.5	2	7	2
572H32P2	2.2	3	10.5 *	2
572H33P0	3.0	4	14	3
572H34P0	4.0	5	18	3
572H35P5	5.5	7.5	25 *	3
572H37P5	7.5	10	39	4
572H3011	11	15	46	4
572H3015	15	20	61	4
572H3018	18.5	25	72	4
572H3022	22	30	90	4
572H3030	30	40	110	5
572H3037	37	50	150	5
572H3045	45	60	180	5
Fenner Part Number	kW	HP	Output Current (A)	Frame Size
572H41P5	1.5	2	4.1	2
572H42P2	2.2	3	5.8	2
572H44P0	4	5	9.5	2
572H45P5	5.5	7.5	14	3
572H47P5	7.5	10	18	3
572H4011	11	15	25 *	3
572H4015	15	20	30	3
572H4018	18.5	25	39	4
572H4022	22	30	46	4
572H4030	30	40	61	4
572H4037	37	50	72	4
572H4045	45	60	90	4
572H4055	55	75	110	5
572H4075	75	100	150	5
572H4090	90	150	180	5
572H4110	110	160	202	6
572H4132	132	200	240	6
572H4160	160	250	300	6


Notes

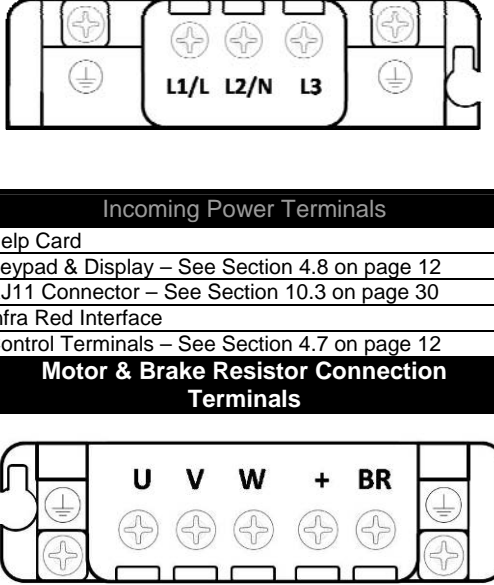
* Indicates models that are not UL listed

3. Mechanical Installation

3.1. Mechanical dimensions and mounting

Frame Size 2



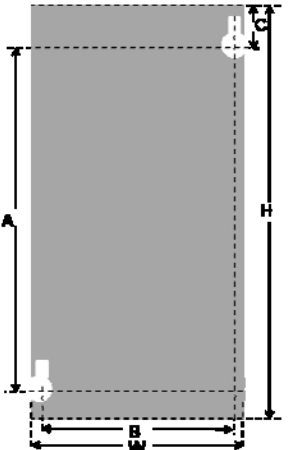


Incoming Power Terminals

Help Card
Keypad & Display – See Section 4.8 on page 12
RJ11 Connector – See Section 10.3 on page 30
Infra Red Interface
Control Terminals – See Section 4.7 on page 12

Motor & Brake Resistor Connection Terminals

Overall Dimensions



Height	260mm
Width	100mm
Depth	175mm
A	210mm
B	92mm
C	25mm


Footprint View

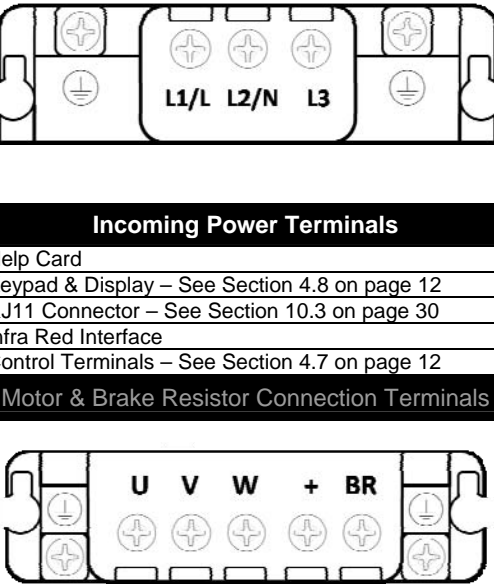
Weight: 2.6kg

Fixings: 2 x M4 Keyhole slots

Power Terminals Torque Setting: 1Nm

Frame Size 3



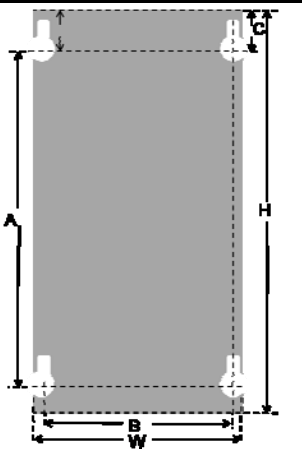


Incoming Power Terminals

Help Card
Keypad & Display – See Section 4.8 on page 12
RJ11 Connector – See Section 10.3 on page 30
Infra Red Interface
Control Terminals – See Section 4.7 on page 12

Motor & Brake Resistor Connection Terminals

Overall Dimensions



Height	260mm
Width	171mm
Depth	175mm
A	210mm
B	163mm
C	25mm


Footprint View

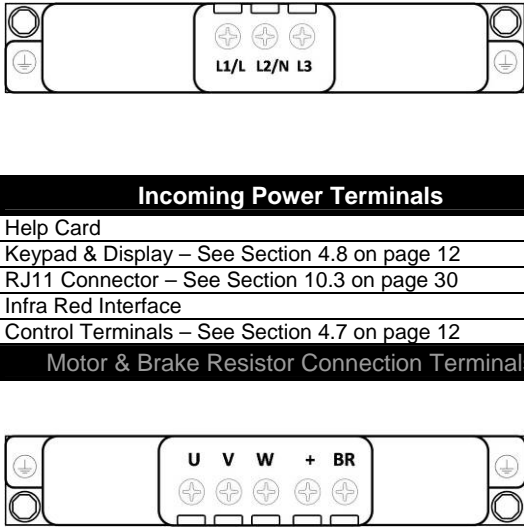
Weight: 5.3kg

Fixings: 4 x M4 Keyhole slots

Power Terminals Torque Setting: 1Nm

Frame Size 4






Overall Dimensions	
Height	520mm
Width	340mm
Depth	220mm
A	420mm
B	320mm
C	50mm
Footprint View	
Weight: 28kg	

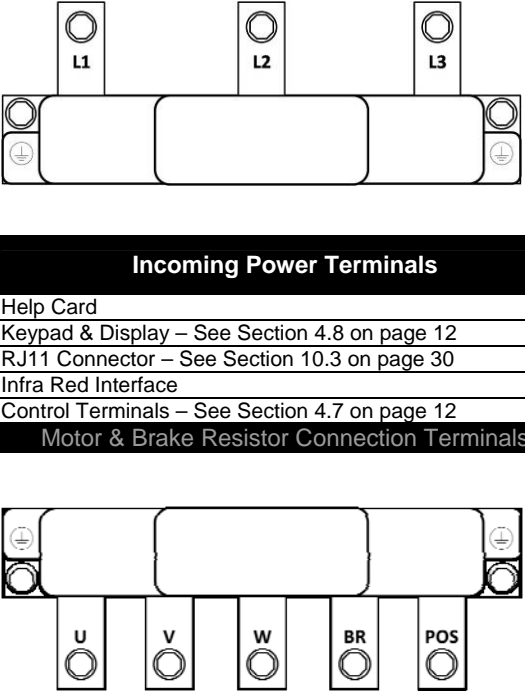
Fixings: 4 x M8 Keyhole slots

Power Terminals Torque Setting: 4Nm

Incoming Power Terminals
Help Card
Keypad & Display – See Section 4.8 on page 12
RJ11 Connector – See Section 10.3 on page 30
Infra Red Interface
Control Terminals – See Section 4.7 on page 12
Motor & Brake Resistor Connection Terminals

Frame Sizes 5 & 6





Overall Dimensions	
Height	1100mm
Width	340mm
Depth	330mm
A	945mm
B	320mm
C	50mm
Footprint View	
Weights: Size 5: 67Kg Size 6: 55Kg (+ 27Kg Choke)	

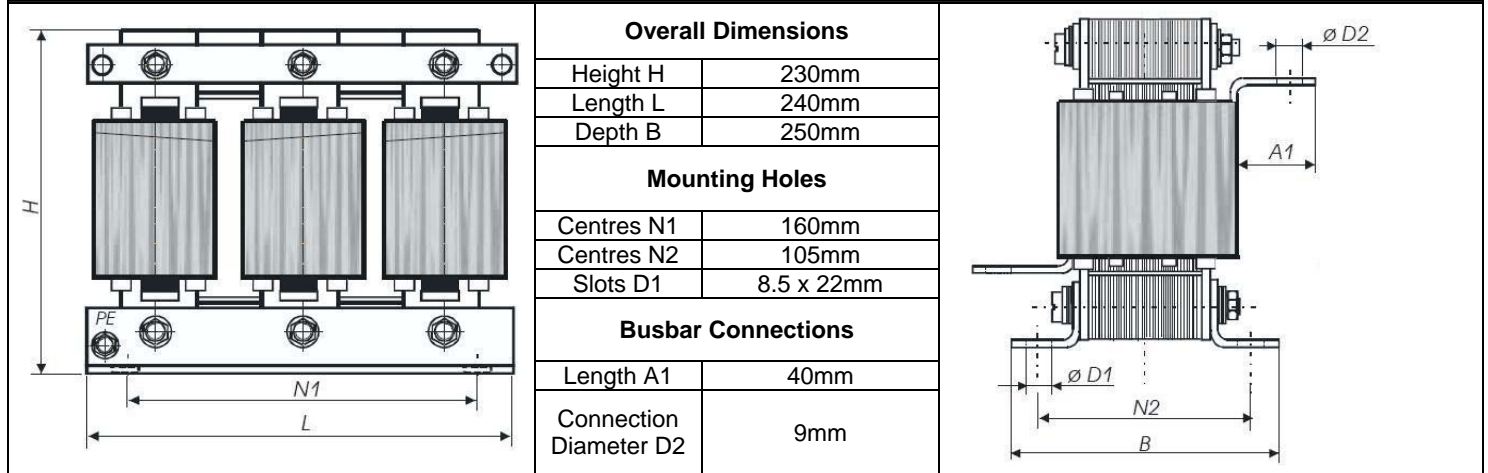
Fixings: 4 x M8 Keyhole slots

Power Terminals Torque Setting: 8Nm

Incoming Power Terminals
Help Card
Keypad & Display – See Section 4.8 on page 12
RJ11 Connector – See Section 10.3 on page 30
Infra Red Interface
Control Terminals – See Section 4.7 on page 12
Motor & Brake Resistor Connection Terminals

Frame Size 6 Additional Input Choke

QD:VT Frame Size 6 is supplied complete with an external Input Choke



Note: The choke is always supplied with the drive, and MUST be used.

3.2. Before Installation

- Carefully unpack the drive and check for any signs of damage. Notify the courier immediately if any damage exists.
- Check the drive rating plate to ensure that the correct power and type have been supplied to suit the application.
- Store the QD:VT in its box until required. Storage area should be clean and dry within the temperature range -40°C to $+60^{\circ}\text{C}$

3.3. General Installation

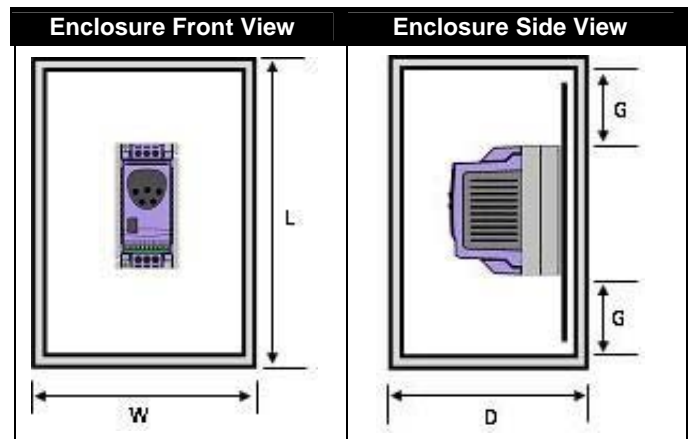
- The QD:VT should be mounted vertically onto a flat, flame retardant surface free of vibration.
- The Drive must only be mounted in pollution degree 1 or 2 environments.
- Do not mount flammable material close to the drive.
- Ensure that the minimum cooling air gaps are observed (see section 3.4)

3.4. Enclosure mounting

For applications that require a higher IP rating than the IP20 offered by the standard drive, the drive must be mounted in a suitable metallic enclosure. The following guidelines should be observed for these applications:

- Carefully inspect the QD:VT prior to commencing to ensure it is undamaged
- Install the QD:VT on a flat, vertical, flame-resistant, vibration-free mounting.
- For IP20 QD:VT, install in a suitable enclosure, according to EN60529 if specific Ingress Protection ratings are required.
- Enclosures should be made from a thermally conductive material
- Do not mount flammable material close to the QD:VT
- Where vented enclosures are used, there should be venting above and below the drive to ensure good air circulation – see the diagram below. Air should be drawn in below the drive and expelled above the drive.
- In any environments where the conditions require it, the enclosure must be designed to protect the QD:VT against ingress of airborne dust, corrosive gases or liquids, conductive contaminants (such as condensation, carbon dust, and metallic particles) and sprays or splashing water from all directions.
- High moisture, salt or chemical content environments should use a suitably sealed (non-vented) enclosure.

230V Part No	400V Part No	L	W	D	G
572H21P5 572H31P5	572H41P5 572H42P2	400	300	300	60
572H22P2 572H32P2	572H43P0 572H44P0	600	450	300	100






The enclosure design and layout should ensure that adequate ventilation paths and clearances are left to allow air to circulate through the drive heat-sink. Eriks Industrial Services recommend the following minimum sizes for drives mounted in non-ventilated metallic enclosures:-

For drives mounted in free ventilated enclosures or force ventilated enclosures, Eriks Industrial Services recommends the following minimum sizes and airflow requirements:-

			Free-Vented unit				Force-vented unit				
	230V Part No	400V Part No	L	W	D	G	L	W	D	G	Air Flow
	-	572H43P0 572H44P0	600	400	250	100	320	200	200	75	> 45m ³ /h
	-	572H45P5 572H47P5 572H4011 572H4015	800	600	300	150	400	250	200	100	> 80m ³ /h
	-	572H4018 572H4022	1000	600	300	200	800	500	250	130	> 300m ³ /h
	-	572H4030 572H4037 572H4045	-	-	-	-	800	500	250	130	> 300m ³ /h
	-	572H4055 572H4075 572H4090	-	-	-	-	1500	600	400	200	> 900m ³ /h
	-	572H4110 572H4132 572H4160	-	-	-	-	1600	600	400	250	>1000m ³ /h

4. Power and Control Connections

4.1. Grounding the Drive

	This manual is intended as a guide for proper installation. Eriks Industrial Services Ltd cannot assume responsibility for the compliance or the non-compliance to any code, national, local or otherwise, for the proper installation of this drive or associated equipment. A hazard of personal injury and/or equipment damage exists if codes are ignored during installation.
	This QD:VT contains high voltage capacitors that take time to discharge after removal of the mains supply. Before working on the drive, ensure isolation of the mains supply from line inputs. Wait ten (10) minutes for the capacitors to discharge to safe voltage levels. Failure to observe this precaution could result in severe bodily injury or loss of life.
	Only qualified electrical personnel familiar with the construction and operation of this equipment and the hazards involved should install, adjust, operate, or service this equipment. Read and understand this manual and other applicable manuals in their entirety before proceeding. Failure to observe this precaution could result in severe bodily injury or loss of life.

Grounding Guidelines

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

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.

Motor Ground

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

Ground Fault Monitoring

If a system ground fault monitor is to be used; only Type B devices should be used to avoid nuisance tripping.

Shield Termination (Cable Screen)

The safety ground terminal provides a grounding point for the motor cable shield. The motor cable shield should be connected to this terminal (drive end) and 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. When shielded cable is used for control and signal wiring, the shield should be grounded at both ends.

4.2. Wiring Precautions

Connect the QD:VT according to section 4.4 Connection Diagram, ensuring that motor terminal box connections are correct. There are two connections in general: Star and Delta. It is essential to ensure that the motor is connected in accordance with the voltage at which it will be operated. For more information, refer to section 4.6 Motor Terminal Box Connections.

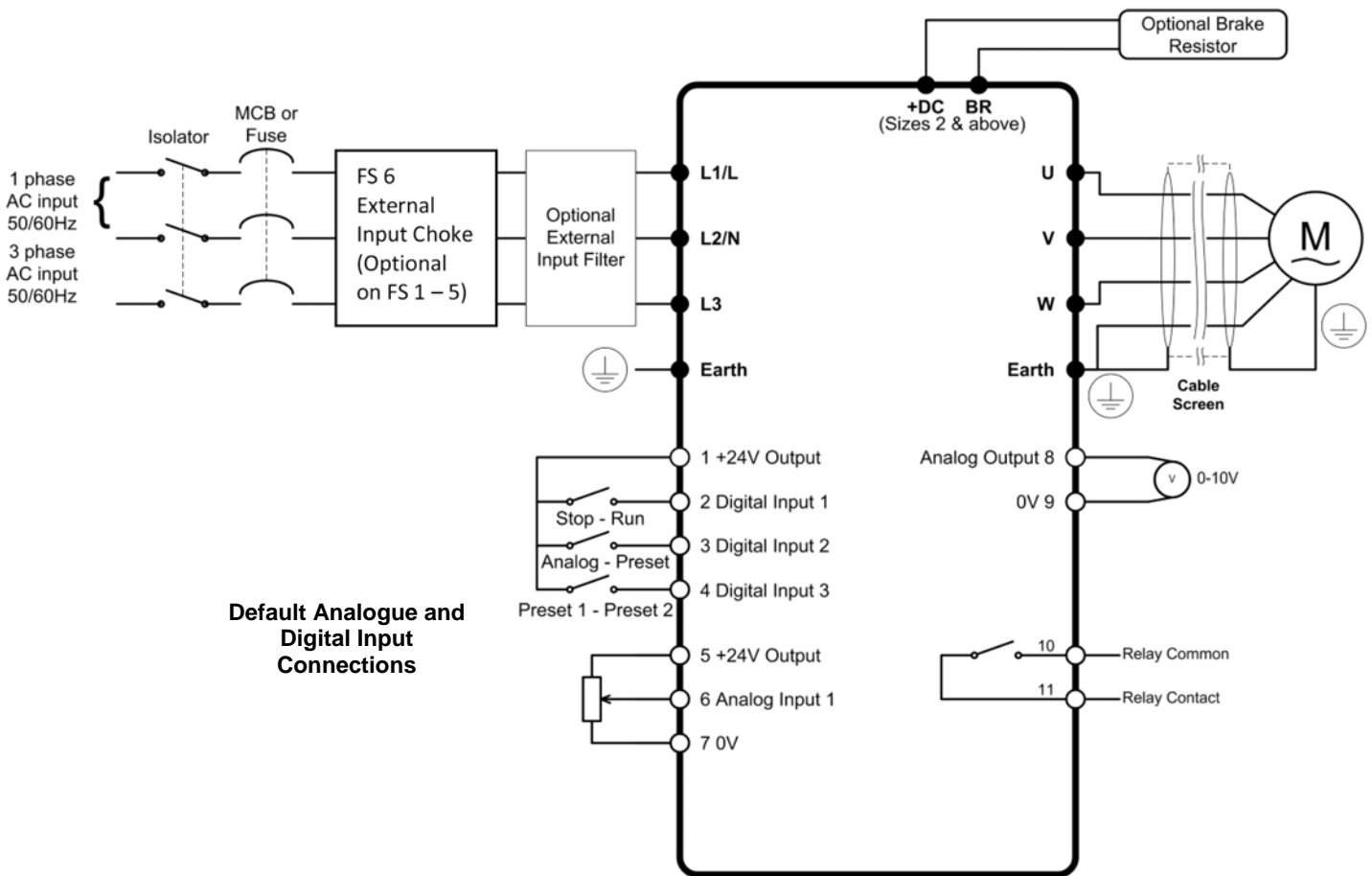
For recommended cabling and wiring sizing, refer to section 9.2 Rating tables.

It is recommended that the power cabling should be 3-core or 4-core PVC-insulated screened cable.

4.3. Incoming Power Supply

- Connect 1 phase supply to L1/L, L2/N / 3 phase supply to L1,L2 and L3 (phase sequence is not important)
- The QD:VT should be connected to a fixed supply using a suitable disconnecting device between the QD:VT and the AC Power Source. The disconnecting device must conform to the local safety code / regulations.
- The cables should be dimensions according to any local codes or regulations. Guideline dimensions are given in section 9.2.
- Suitable fuses to provide wiring protection should be installed in the incoming supply line, according to the data in section 9.2. The fuses must comply with any local codes or regulations in place. In general, IEC type gG or UL type T fuses are suitable. The operating time of the fuses must be below 0.5 seconds.
- Where allowed by local regulations, suitably dimensioned circuit breakers may be utilised in place of fuses. Thermal overload protection is not required, as the QD:VT provides thermal protection for the motor and motor cable. (See section 9.2)
- When the power supply is removed from the drive, a minimum of 30 seconds should be allowed before re-applying the power. A minimum of 10 minutes should be allowed before removing the terminal covers or connection.
- The maximum permissible short circuit current at the QD:VT Power terminals as defined in IEC60439-1 is 100kA.
- An Input Choke should be installed in the supply line for frame size 1 to 3 QD:VT where any of the following conditions occur:-
 - The incoming supply impedance is low or the fault level / short circuit current is high
 - The supply is prone to dips or brown outs
 - An imbalance exists on the supply (3 phase drives)
 - All installations of Frame Size 2 drives on 575 Volt Supply
- In all other installations, an input choke is recommended to ensure protection of the drive against power supply faults. The recommended chokes can be found in the Fenner Drive Design Manual
- For compliance with CE and C Tick EMC requirements, a symmetrical shielded cable is recommended.

4.4. Connection Diagram



4.5. Motor connections and cables

- The motor should be connected to U, V, and W terminals
- To comply with EMC directives, shielded cable should be used with the shield bonded to earth at the drive and motor ends.
- Further information can be found in the Advanced User Guide.

4.6. Motor Terminal Box Connections

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. STAR always gives the higher of the two voltage ratings.

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

4.7. Control terminal connections

Default Connections	Control Terminal	Signal	Description
	1	+24V User Output,	+24V, 100mA user control output
	2	Digital Input 1	Positive logic "Logic 1" input voltage range: 8V ... 30V DC "Logic 0" input voltage range: 0V ... 8V DC
	3	Digital Input 2 / Digital Output 3	Input: Positive logic "Logic 1" input voltage range: 8V ... 30V DC "Logic 0" input voltage range: 0V ... 8V DC Output: 24V 10mA Max 'Drive Healthy' Output
	4	Digital Input 3 / Analogue Input 2	Digital: "Logic 1" input voltage range: 8 to 30V DC "Logic 0" input voltage range: 0 to 8 V DC Analogue: 0 to 10V, 0 to 20mA or 4 to 20mA
	5	+24V User Output	+24V, 100mA, 1kΩ minimum
	6	Bipolar analog Input / Digital Input 4	Digital: "Logic 1" input voltage range: 8 to 30V DC "Logic 0" input voltage range: 0 to 8 V DC Analogue: 0 to 24V, 0 to 10V, -10 to +10V, -24 to + 24V
	7	0V	User ground, connected to terminal 9
	8	Analogue Output / Digital Output	Analogue: 0 to 10V DC, 20mA Maximum Digital: 0 to 24V DC, 20mA Maximum
	9	0V	User ground, connected to terminal 7
	10	Relay Common	Volt free contacts. Maximum load should not exceed 250Vac, 6A / 30Vdc, 5A
	11	Relay NO Contact	

4.8. Electromagnetic Compatibility

All QD:VT Drives are designed to high standards of EMC and are fitted with an internal EMC filter. This EMC filter is designed to reduce the conducted emissions back into the supply via the power cables for compliance with 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. Within the European Union, equipment into which this product is incorporated must comply with 89/336/EEC, EMC. When using the internal filter, the following maximum motor cable lengths apply:-

Drive Frame Size	Screened Motor Cable Length With Internal Filter		
	C1	C2	C3
230 Volt 1 phase Input			
Size 2	1m	5m	25m
400 Volt 3 phase Input			
Size 2	5m	25m	50m
Size 3	5m	25m	50m
Size 4	5m	25m	50m
Size 5	5m	25m	50m
Size 6	5m	25m	50m
Notes	For motor cable lengths greater than 100m, an output dv/dt filter must be used, please contact your Fenner Drives distributor for further details.		
	For Size 5 and 6 drives, a ferrite ring must be installed on the output motor cable, with all three phases of the motor cable being wrapped one turn around the ferrite ring.		

5. Operation

5.1. 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	






5.2. Changing Parameters

Procedure		
Power on Drive		STOP
Press and hold the for >2 seconds		P 1-01
Press the Key		P 1-02
The and can be used to select the desired parameter		P 1-03 etc...
Select the required parameter, e.g. P1-02		P 1-02
Press the button		~ 0.0
Use the and keys to adjust the value, e.g. set to 10		10.0
Press the key		P 1-02
The parameter value is now adjusted and automatically stored. Press the key for >2 seconds to return to operating mode		STOP

5.3. Advanced Keypad Operation Short Cuts




Function	When Display shows...	Press...	Result	Example
Fast Selection of Parameter Groups Note : Parameter Group Access must be enabled P1-14 = 101	Px-xx	 + 	The next highest Parameter group is selected	Display shows P 1- 10 Press  +  Display shows P 2- 0 1
	Px-xx	 + 	The next lowest Parameter group is selected	Display shows P 2- 26 Press  +  Display shows P 1- 0 1
Select lowest Group Parameter	Px-xx	 + 	The first parameter of a group is selected	Display shows P 1- 10 Press  +  Display shows P 1- 0 1
Set Parameter to minimum value	Any numerical value (Whilst editing a parameter value)	 + 	The parameter is set to the minimum value	When editing P1-01 Display shows 50.0 Press  +  Display shows 0.0
Adjusting individual digits within a parameter value	Any numerical value (Whilst editing a parameter value)	 + 	Individual parameter digits can be adjusted	When editing P1-10 Display shows 0 Press  +  Display shows - 0 Press  Display shows 1 0 Press  +  Display shows - 1 0 Press  Display shows 1 1 0 Etc...

5.4. Reset All Parameters to Factory Default Settings

To reset all drive parameters to factory default settings, press  +  +  +  for >2s. The display shows P- DEF
Press the  button to acknowledge and reset the drive.
















5.5. Terminal Control

When delivered, the QD:VT is in the factory default state, meaning that it is set to operate in terminal control mode and all parameters have the default values as indicated in section 6 Parameters.

- Connect the drive to the supply, ensuring the correct voltage and fusing / circuit breaker protection – see section 9.2.
- Connect the motor to the drive, ensuring the correct star/delta connection for the voltage rating - see section 4.6.
- Enter the motor data from motor nameplate; P1-07 = rated voltage, P1-08 = rated current, P1-09 = rated frequency.
- Connect a control switch between the control terminals 1 and 2 ensuring that the contact is open (drive disabled).
- Connect a potentiometer (1kΩ min to 10 kΩ max) between terminals 5 and 7, and the wiper to terminal 6.
- With the potentiometer set to zero, switch on the supply to the drive. The display will show **StoP**.
- Close the control switch, terminals 1-2. The drive is now 'enabled' and the output frequency/speed are controlled by the potentiometer.
- On first enable from factory default parameters, the QD:VT will carry out an Auto-tune, and the display shows **Auto-t**. Leave the control switch closed and allow the process to complete.
- Following completion of the Auto-tune, the display shows zero speed in Hz (**H 0.0**) with the pot. turned to minimum.
- Turn the potentiometer to maximum. The motor will accelerate to 50Hz, the default value of P1-01, under the control of the acceleration ramp time P1-03.
- The display shows 50Hz (**H 50.0**) at max speed.
- If the potentiometer is turned to minimum, the motor will decelerate to 0Hz, the default minimum speed set in P1-02, under the control of the deceleration ramp P1-04. The output speed can be adjusted anywhere between minimum and maximum speed using the potentiometer.
- To display motor current (Amps), briefly press the  (Navigate) key.
- Press  again to display the motor power.
- Press  again to return to speed display.
- To stop the motor, disable the drive by opening the control switch (terminals 1-2).
- If the enable/disable switch is opened the drive will decelerate to stop at which time the display will show **StoP**.


5.6. Keypad Control

To allow the QD:VT to be controlled from the keypad in a forward direction only, set P1-12 =1:

- Connect the supply and motor as for terminal control above.
- Enable the drive by closing the switch between control terminals 1 & 2. The display will show **StoP**.
- Press the  key. If this is the first enable from factory default parameters, the drive will carry out an Auto-tune as described above. On completion of the Auto-tune, the display shows **H 0.0**.
- Press  to increase speed.
- The drive will run forward, increasing speed until  is released.
- Press  to decrease speed. The drive will decrease speed until  is released. The rate of deceleration is limited by the setting in P1-04.
- Press the  key. The drive will decelerate to rest at the rate set in P1-04.
- The display will finally show **StoP** at which point the drive is disabled.
- To preset a target speed prior to enable, press the  key whilst the drive is stopped. The display will show the target speed, use the  &  keys to adjust as required then press the  key to return the display to **StoP**.
- Pressing the  key will start the drive accelerating to the target speed.
- To allow the QD:VT to be controlled from the keypad in a forward and reverse direction, set P1-12 =2:
- Operation is the same as when P1-12=1 for start, stop and changing speed.
- Press the  key. The display changes to **H 0.0**.
- Press  to increase speed
- The drive will run forward, increasing speed until  is released. Acceleration is limited by the setting in P1-03. The maximum speed is the speed set in P1-01.
- To reverse the direction of rotation of the motor, press the  key again.

5.7. Motor Auto-tuning

QD:VT uses a sophisticated Voltage Vector Control Method as a factory default setting to ensure best possible motor operation. This control method requires the QD:VT to carry out an auto-tune to measure certain motor parameters prior to operation, to ensure this function operates correctly, and reduce the risk of nuisance tripping.

 WARNING	<p>Whilst the auto-tune procedure does not drive or spin the motor, the motor shaft may still turn. It is not normally necessary to uncouple the load from the motor; however the user should ensure that no risk arises from the possible movement of the motor shaft.</p>
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Auto-tune after Factory Reset or from Factory Set Parameters


Following a factory reset (See section 5.4), the correct data from the motor nameplate should be entered in P1-07 (Motor Rated Voltage), P1-08 (Motor Rated Current) and P1-09 (Motor Rated Frequency). Providing that P1-08 is adjusted from the factory default setting, the drive will automatically carry out an auto-tune on the motor the first time it is enabled. During the auto-tune, the display will show **Auto-t**. The test procedure may take several minutes to complete depending on the motor. Once the auto-tune is completed, the drive will operate as normal, and no further auto-tuning will be required unless the motor or drive control mode is changed (P4-01).


User Selected Auto-tune

The user can program the drive to carry out an auto-tune if required, as follows:-

Ensure the motor nameplate values are correctly entered as described above.

Set P1-14 = 101 to allow access to Parameter Groups 2, 3 and 4

Set P4-02 = 1 and press the  button.

 CAUTION	<p>The auto-tune will begin immediately when P4-02 is set to 1, and no external enable signal is required. During the auto-tune procedure, the motor shaft may turn. It is not normally necessary to uncouple the load from the motor; however the user should ensure that no risk arises from the possible movement of the motor shaft.</p>
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6. Parameters

6.1. Parameter Group 1 – Basic Parameters

Par.	Description	Range	Units	Default	Explanation
P1-01	Max Frequency / Speed	P1-02 to 120Hz	Hz Rpm	50Hz	Maximum speed limit – Hz or rpm. If P1-10 >0, the value entered is in Rpm
P1-02	Min Frequency / Speed	0 to P1-01	Hz Rpm	0Hz	Minimum speed limit – Hz or rpm. If P1-10 >0, the value entered is in Rpm
P1-03	Acceleration ramp time	0 to 3000	Sec	30s	Acceleration ramp time from 0 to base speed (P1-09) in seconds
P1-04	Deceleration ramp time	0 to 3000	Sec	30s	Deceleration ramp time from base speed (P1-09) to standstill in seconds. When set to zero, fastest possible ramp time without trip is activated
P1-05	Stop mode select	0: Ramp to stop with brown-out ride-through on mains loss 1: Coast to stop 2: Ramp to stop with 'fast stop' on mains loss	-	0	0: When the drive enable signal is removed, the drive will ramp to stop at the rate set in P1-04. If the mains supply is lost, the drive will try to continue running by reducing the speed of the load using the load as a generator. 1: When the enable signal is removed from the drive, the motor will coast (freewheel) to stop 2: When the drive enable signal is removed, the drive will ramp to stop at the rate set in P1-04. If the mains supply is lost, the drive will ramp to stop using the P2-25 decel ramp time
P1-06	Energy Optimiser	0: Disabled 1: Enabled	-	0	When enabled, automatically reduces applied motor voltage on light load. Minimum value is 50% of nominal rated voltage (P1-07)
P1-07	Motor rated voltage	0, 20 to 250 0, 20 to 500	Volts	230 400	Rated (nameplate) voltage of the motor (Volts). Value limited to 250V for low voltage drives.
P1-08	Motor rated current	25% -100% of drive rated current	Amps	Drive rating	Enter the rated (nameplate) current of the motor. This value is used for overload protection
P1-09	Motor rated frequency	25Hz to 120Hz	Hz	50	Enter the rated (nameplate) frequency of the motor
P1-10	Motor rated speed	0 to 7200 rpm	Rpm	0	When non-zero, all speed related parameters are displayed in rpm. Enter the motor rated (nameplate) speed if this is required.
P1-11	Preset Speed 1	-P1-01 to P1-01	Hz / Rpm	50	Sets the speed the drive runs at when Preset Speed 1 is selected
P1-12	Terminal / Keypad / PID Drive Control Mode Selection	0: Terminal control 1: Keypad control – fwd only 2: Keypad control – fwd and rev 3: PID Control 4: Modbus RTU Control	-	0	Primary Control Mode of the drive. 0: Terminal control 1: Uni-directional keypad control. Keypad START button does not reverse direction. 2: Bi-directional keypad control. Keypad START button toggles between forward and reverse. 3: User PID control with external feedback signal 4: Modbus RTU Control. See section 10
P1-13	Trip log	Last four trips stored	-	Read only	Previous 4 trips stored in order of occurrence, with the most recent first. Press UP or DOWN to step through all four. The most recent trip is always displayed first. UV trip is only stored once.
P1-14	Extended menu access	Code 0 to 9999	-	0	Set to "101" (default) for extended menu access. Change code in P2-37 to prevent unauthorised access to the Extended Parameter Set

Following a factory reset, or when installing a drive for the first time, only Group 1 Parameter access is available. To allow access to Parameters Groups 0, 2, 3 and 4, Parameters P1-14 and P2-37 must contain the same value. The factory set value for P2-37 = 101

6.2. Parameter Group 2 - Extended parameters

Par.	Description	Range	Units	Default	Explanation
P2-01	Digital input function select	0 to 23	-	0	Defines the function of the digital inputs depending on the control mode setting in P1-12. See section 7 Analogue and Digital Input Configurations for more information.
P2-02	Preset Speed 2	-P1-01 to P1-01	Hz / Rpm	0	Sets jog / preset speed 2
P2-03	Preset Speed 3	-P1-01 to P1-01	Hz / Rpm	0	Sets jog / preset speed 3
P2-04	Preset Speed 4	-P1-01 to P1-01	Hz / Rpm	0	Sets jog / preset speed 4
P2-05	Preset Speed 5	-P1-01 to P1-01	Hz / Rpm	0	Sets jog / preset speed 5
P2-06	Preset Speed 6	-P1-01 to P1-01	Hz / Rpm	0	Sets jog / preset speed 6
P2-07	Preset speed 7	-P1-01 to P1-01	Hz / Rpm	0	Sets jog / preset speed 7
P2-08	Preset speed 8	-P1-01 to P1-01	Hz / Rpm	0	Sets jog / preset speed 8
P2-09	Skip frequency	P1-02 to P1-01	Hz / Rpm	0	Centre point of skip frequency band set up in conjunction with P2-10
P2-10	Skip frequency band	0 to P1-01	Hz / Rpm	0	Width of skip frequency band centred on frequency set in P2-09
P2-11	Analogue output / Digital Output 1 Function select	Digital output mode 0: Drive enabled 1: Drive healthy 2: Motor at target speed 3: Motor Speed > 0 4: Motor speed > limit 5: Motor current > limit 6: 2 nd Analogue Input>limit Analogue output mode 7: Motor speed 8: Motor current 9: Motor power		7	Digital output mode (Logic 1 = +24V DC) 0: Logic 1 when the drive is Running 1: Logic 1 when no Fault exists 2: Logic 1 when motor speed = set-point speed 3: Logic 1 when motor runs above zero speed Options 4 to 6: the Digital output is enabled using the level set in P2-12h and P2-12L Analogue output mode 7: Motor Speed, 0 to 10V = 0 to P-01 8: Motor torque, 0 to 10V = 0 to 200% of torque 9: Motor power, 0 to 10V = 0 to 150% of power 10: Motor Current, 0 to 10V = 0 to 200% of P1-08
P2-12h	Digital Output Control High Limit	0 to 200	%	0	With P2-11 = 4 to 6, Digital Output 1 is set to Logic 1 (+24V DC) when the value set in P2-12h is exceeded, and returns to Logic 0 (0V) when the selected value reduces below the limit set in P2-12L
P2-12L	Digital Output Control Low Limit	0 to 200	%	0	
P2-13	User Relay Output Function Select	0: Drive enabled 1: Drive healthy 2: Motor at target speed 3: Motor Speed > 0 4: Motor speed > limit 5: Motor current > limit 6: 2 nd Analogue Input>limit		1	Select function assigned to the relay output. 0: Logic 1 when the drive is Running 1: Logic 1 when no Fault exists on the drive 2: Logic 1 when motor speed = set-point speed 3: Logic 1 when motor runs above zero speed Options 4 to 6: the Digital output is enabled using the level set in P2-14h and P2-14L
P2-14h	Relay Output Control High Limit	0 to 200	%	0	With P2-13 = 4 to 6, the User Relay Output is set to Logic 1 (+24V DC) when the value set in P2-14h is exceeded, and returns to Logic 0 (0V) when the selected value reduces below the limit set in P2-12L
P2-14L	Relay Output Control Low Limit	0 to 200	%	0	
P2-15	Relay Output Mode	0: Normally Open 1: Normally Closed	-	1	Inverts the operating status of the User Relay 0: Logic 1 = Relay Contacts Closed 1: Logic 1 = Relay Contacts Open The drive must be powered for the contacts to close
P2-16	Stand-by Mode Wake up speed	0 to 100.0	Sec	0.0	Drive will wake from standby mode if the setpoint exceeds this value.

Par.	Description	Range	Units	Default	Explanation
P2-17	Start Mode Select	Edge-r Auto-0 Auto-1 to 5	-	Auto-0	Edge-r: Following Power on or reset, the drive will not start if Digital Input 1 remains closed. The Input must be closed following a power on or reset to start the drive. Auto-0: Following a Power On or Reset, the drive will automatically start if Digital Input 1 is closed. Auto 1 to 5: Following a Fault, the drive will make up to 5 attempts to restart at 20 second intervals. The drive must be powered down to reset the counter
P2-18	Spin Start Enable	0: Disabled 1: Enabled	-	1	When enabled, on start up the drive will attempt to determine if the motor is already rotating, and will begin to control the motor from its current speed. A short delay may be observed when starting motors which are not turning
P2-19	Keypad Restart Mode	0: Minimum Speed, Edge-r 1: Previous Speed, Edge-r 2: Minimum Speed, Auto-r 3: Previous Speed, Auto-r	-	1	Active when P1-12 = 1 or 2 0: Following a stop and restart, the drive will run at minimum speed 1: Following a stop and restart, the drive will run at the last setpoint speed 2: As per setting 0, except that the Run command will be determined by the status of Digital Input 1, and the user is not required to press the keypad start button 3: As per setting 1, except that the Run command will be determined by the status of Digital Input 1, and the user is not required to press the keypad start button
P2-20	Standby Mode	0: Disabled 0.0 to 60.0	Sec	0.0	When P2-20 >0, the drive enters standby mode if the minimum speed is maintained for the time period set in P2-20. Note: P2-16 must be set to zero for standby mode to operate
P2-21	Display Scaling Factor	0.000 to 30.000	-	0	Disabled if P2-21 is set to 0.
P2-22	Display Scaling Source	0: 2 nd Analogue Input 1: Motor Speed 2: Motor Torque 3: Motor Current	-	0	If P2-21 is set >0, the variable selected in P2-22 is multiplied by the factor entered in P2-21, and displayed whilst the drive is running
P2-23	Brake Circuit Enable	0: Disabled 1: Enabled, Low Duty 2: Enabled, High Duty 3: Enabled, No Protection	-	0	Enables the internal brake chopper on Size 2 and above drives. Settings 1 and 2 provide software monitoring of the braking power consumption. Setting 3 disables the protection, and externally monitoring must be used
P2-24	Effective Switching Frequency	4 to 16 / 24 / 32 / Auto Drive Power Rating Dependent	kHz	16 8 4	Effective power stage switching frequency. Higher frequencies reduce the audible 'ringing' noise from the motor, and improve the output current waveform, at the expense of increased drive losses
P2-25	2 nd Deceleration Ramp time	0 to 3000	Sec	0.0	Deceleration 2 nd ramp down time Selected Automatically on mains power loss if P1-05 = 2 Can also be selected by digital inputs, dependent on P2-01 setting. When set to 0, the drive decelerates as quickly as possible, whilst preventing an overvoltage trip
P2-26	Modbus Communication Baud Rate	t9.6, t19.2, t38.4, t57.6, t115.2 r9.6, r19.2, r38.4, r57.6, r115.2	kbaud	t115.2	Modbus RTU serial data link communication Baud Rate. A 't' Prefix indicates the drive will trip if communication with the network master is lost, after a preset time period. An 'r' Prefix indicates that the QD:VT will Ramp to stop if communication with the network master is lost, after a preset time period .
P2-27	Drive Communication Address	0: Disabled 1 to 63	-	1	Sets the communication address for the drive when connected on an Q-bus or Modbus Network
P2-28	Master / Slave Mode Select	0: Slave Mode 1: Master Mode	-	0	When in Master Mode, the drive transmits its operational status via the serial data link. All drives on the data link must have unique addresses. Only one drive can be programmed as a Master

Par.	Description	Range	Units	Default	Explanation
P2-29	Digital / Slave speed reference scaling factor	0 to 500.0	%	100.0	Scaling factor applied to any speed reference on the serial data link, e.g. in Master / Slave operation, a Slave drive will apply this scaling factor to the transmitted Master speed reference
P2-30	Bipolar analogue input format	U 0-24 = 0 - 24V DC U 0-10 = 0 - 10V DC -10 -10 = -10 to + 10V DC -24 -24 = -24 to + 24V DC	-	U 0-24	Configures the analogue input signal to match the reference connected to terminal 6. Only voltage signals can be directly connected, mA reference signals require an external 500R resistor connection.
P2-31	Bipolar analogue input scaling	0 to 500.0	%	100.0	Scales the analogue input by this factor, e.g. if P2-30 is set for 0 – 10V, and the scaling factor is set to 200.0%, a 5 volt input will result in the drive running at maximum speed (P1-01)
P2-32	Bipolar analogue input offset	-500.0 to 500.0	%	0.0	Sets an offset, as a percentage of the full scale range of the input, which is applied to the analogue input signal
P2-33	2 nd analogue input format	d 0-24 = Digital U 0-10 = 0 to 10V DC A 4-20 = 4 to 20mA A0-20 = 0 to 20mA	-	d 0-24	Selects the format for the 2 nd analogue input Selecting d 0-24 sets as a digital input.
P2-34	2 nd analogue input scaling	0 to 500.0	%	100.0	Scales the 2 nd analogue input by the factor set in this parameter
P2-35	Digital speed reference scaling control	0: Disabled (No Scaling) 1: Scaled by P2-29 2: Scaled by P2-29, then bipolar analogue input added as an offset 3: Scaled by P2-29 and by bipolar analogue input	-	0	Active in Keypad mode (P1-12 = 1 or 2) and Master / Slave mode only. 1: Actual Speed = Digital Speed x P2-29 2: Actual Speed = (Digital Speed x P2-29) + bipolar analogue reference 3: Actual Speed = Digital Speed x P2-29 x bipolar analogue reference
P2-36	Analogue output format	U 0-10 = 0 to 10V A 4-20 = 4 to 20mA U 10-0 = 10 to 0V A 20-4 = 20 to 4mA	-	U 0-10	Selects the analogue output signal format
P2-37	Extended menu access code	0 to 9999	-	101	Defines the access code which must be entered in P1-14 to access parameter groups above Group 1
P2-38	Parameter Lock	0: Unlocked 1: Locked	-	0	When locked, all parameter changes are prevented
P2-39	Hours Run Counter	0 to 99999	Hours	Read Only	Indicates the number of hours for which the drive has run
P2-40	Drive Type / Rating	N/A	-	Read Only	Read only parameter, showing the drive type and power rating

6.3. Parameter Group 3 – PID Control

Par.	Description	Range	Units	Default	Explanation
P3-01	Proportional gain	0.1 to 30.0	-	2.0	PID Controller Proportional Gain. Higher values provide a greater change in the drive output frequency in response to small changes in the feedback signal. Too high a value can cause instability
P3-02	Integral time constant	0.0 to 30.0	Sec	1.0	PID Controller Integral Time. Larger values provide a more damped response for systems where the overall process responds slowly
P3-03	Differential time constant	0.00 to 1.0	Sec	0.00	PID Differential Time Constant
P3-04	PID operating mode	0: Direct 1: Inverse	-	0	Direct operation – Motor speed <i>increases</i> with an increase in the feedback signal Inverse Operation – Motor speed <i>decreases</i> with an increase in the feedback signal
P3-05	PID Setpoint / reference select	0: Digital 1: Analogue	-	0	Selects the source for the PID Reference / Set-point 0: P3-06 is used 1: Bipolar analogue input is used
P3-06	PID digital reference	0 to 100.0	%	0.0	Sets the preset digital PID reference / set-point
P3-07	PID controller high limit output	P3-08 to 100	%	100	Limits the maximum value output from the PID controller
P3-08	PID controller low limit output	0 to P3-07	%	0	Limits the minimum output from the PID controller
P3-09	User PID output limit / function control	0: Digital output limits 1: Analogue Upper Limit 2: Analogue Lower Limit 3: PID added to Bipolar analogue input reference	-	0	0: PID output range limited by P3-07 & P3-08 1: PID maximum output limited by the signal applied to the bipolar analogue input 2: PID minimum output limited by the signal applied to the bipolar analogue input 3: PID output is added to the speed reference applied to the bipolar analogue input
P3-10	PID feedback source select	0: 2 nd Analogue Input 1: Bipolar analogue input	-	0	Selects the source of the PID feedback signal

6.4. Parameter Group 4 – High Performance Motor Control

Par.	Description	Range	Units	Default	Explanation
P4-01	<i>Reserved</i>				
P4-02	Motor parameter auto-tune	0: Disabled 1: Enabled	-	0	When set to 1, the drive immediately carries out a non-rotating auto-tune to measure the motor parameters for optimum control and efficiency
P4-03	<i>Reserved</i>				
P4-04	<i>Reserved</i>				
P4-05	<i>Reserved</i>				
P4-06	<i>Reserved</i>				
P4-07	<i>Reserved</i>				
P4-08	<i>Reserved</i>				
P4-09	<i>Reserved</i>				
P4-10	<i>Reserved</i>				

6.5. Parameter Group 0 – Monitoring Parameters (Read Only)

Par.	Description	Display range	Units	Explanation
P0-01	Bipolar analogue input value	-100 to 100	%	100% = max input voltage
P0-02	2 nd Analogue input value	0 to 100	%	100% = max input voltage
P0-03	Post Ramp Speed Reference	-500 to 500	%	100% = P1-09
P0-04	Digital speed reference	-P1-01 to P1-01	Hz / Rpm	Digital speed reference
P0-05	<i>Reserved</i>			
P0-06	PID Reference	0 to 100	%	PID reference / set-point
P0-07	PID Feedback	0 to 100	%	PID controller feedback value
P0-08	PID error	0 to 100	%	Actual PID error
P0-09	PID P Term	0 to 100	%	Proportional component
P0-10	PID I term	0 to 100	%	Integral component
P0-11	PID D term	0 to 100	%	Differential component
P0-12	PID Output	0 to 100	%	Output from PID controller
P0-13	Applied motor voltage	0 to 500	V rms ph/ph	Applied voltage on motor
P0-14	Magnetising current	Drive dependent	A	Motor rms magnetising current
P0-15	<i>Reserved</i>			
P0-16	Field Strength	0 to 100	%	Magnetic field strength
P0-17	<i>Reserved</i>			
P0-18	<i>Reserved</i>			
P0-19	Rotor resistance	Drive dependent	Ohms	Calculated rotor resistance
P0-20	DC Bus Voltage	0 to 1000	Volts	Internal DC Bus voltage
P0-21	Drive Temperature	0 to 120	°C	Measured heat-sink temperature
P0-22	Supply voltage L1 – L2	Drive dependent	Volts	Phase to phase supply voltage
P0-23	Supply voltage L2 – L3	Drive dependent	Volts	Phase to phase supply voltage
P0-24	Supply voltage L3 – L1	Drive dependent	Volts	Phase to phase supply voltage
P0-25	<i>Reserved</i>			
P0-26	kWh meter	0 to 999.9	kWh	Cumulative energy consumption
P0-27	MWh meter	0 to 60,000	MWh	Cumulative energy consumption
P0-28	Software ID – IO Processor	Drive dependent	-	Version number & checksum
P0-29	Software ID – Motor Control	Drive dependent	-	Version number & checksum
P0-30	Drive serial number	Drive dependent	-	Unique drive serial number

6.6. Fire Mode

The QD:VT has an integrated “fire mode” function designed to ensure that the QD:VT can continue to operate without interruption in the event of fire. Fire mode disables non-critical trip functions of the drive so that it will continue to operate until either the drive itself, the cable or the motor is destroyed by the fire.

Since normal operation of the QD:VT is overridden when fire mode is activated, it is possible that damage to the ventilation system may result from over-pressure. It is also possible that the drive or motor will fail due to overload.

ERIKS Industrial Services Ltd accept no responsibility for damage to the QD:VT itself or other components and equipment or injury to personnel when the unit is operating in fire mode.

Under no circumstances shall ERIKS Industrial Services be liable to any party for loss or damage whether indirect or direct as a result of the operating the drive in fire mode.







7. Analogue and Digital Input Configurations

7.1. Terminal mode (P1-12 =0)

P2-01	Digital input 1 (T2)	Digital input 2 (T3)	Digital input 3 (T4)	Analogue input (T6)
0	Open: Stop (disable) Closed: Run (enable)	Open: Bipolar analogue speed ref Closed: Preset speed ref	Open: Preset Speed 1 Closed: Preset Speed 2	Bipolar analogue input
1	Open: Stop (disable) Closed: Run (enable)	Open: Preset Speed 1 Closed: Preset speed 2	Open: Preset speed 1 / 2 Closed: Preset speed 3	Open: Preset Speed 1 / 2 / 3 Closed: Preset Speed 4
2	Open: Stop (disable) Closed: Run (enable)	Digital Input 2	Digital Input 3	Bipolar analogue input
		Open	Open	Open
		Closed	Open	Open
		Open	Closed	Open
		Closed	Closed	Open
		Open	Open	Closed
		Closed	Open	Closed
		Open	Closed	Closed
3	Open: Stop (disable) Closed: Run (enable)	Open: Forward Closed: Reverse	Open: Bipolar analogue ref Closed: Preset Speed 1	Bipolar analogue input
4	Open: Stop (disable) Closed: Run (enable)	Open: Forward Closed: Reverse	Analogue input 2	Bipolar analogue input
5	Open: Stop (disable) Closed: Run (enable)	Open: Forward Closed: Reverse	Digital Input 3	Bipolar analogue input
			Open	Open
			Closed	Open
			Open	Closed
6	Open: Stop (disable) Closed: Run (enable)	Open: Forward Closed: Reverse	External trip input: Open: Trip, Closed: No Trip	Bipolar analogue input
7	Open: Stop (disable) Closed: Fwd Run (enable)	Open: Stop (disable) Closed: Rev Run (enable)	Open: Bipolar analogue speed ref Closed: Preset Speed 1	Bipolar analogue input
8	Open: Stop (disable) Closed: Fwd Run (enable)	Open: Stop (disable) Closed: Rev Run (enable)	Open: Preset Speed 1 Closed: Bipolar analogue speed ref	Bipolar analogue input
9	Open: Stop (disable) Closed: Forward Run (enable)	Open: Stop (disable) Closed: Reverse Run (enable)	Digital Input 3	Bipolar analogue input
			Open	Open
			Closed	Open
			Open	Closed
10	Open: Stop (disable) Closed: Forward Run (enable)	Open: Stop (disable) Closed: Reverse Run (enable)	External trip input: Open: Trip, Closed: No Trip	Bipolar analogue input
11	Open: Stop (disable) Closed: Run (enable)	Open: Bipolar analogue speed ref Closed: Preset speed 1	External trip input: Open: Trip, Closed: No Trip	Bipolar analogue input
12	Open: Stop (disable) Closed: Run (enable)	Open: Preset Speed 1 Closed: Bipolar analogue speed ref	External trip input: Open: Trip, Closed: No Trip	Bipolar analogue input
13	Normally Open (NO) Momentarily Close to Run	Normally Closed (NC) Momentarily Open to Stop	Open: Bipolar analogue speed ref Closed: Preset Speed 1	Bipolar analogue input
14	Normally Open (NO) Momentarily Close to Run Fwd	Normally Closed (NC) Momentarily Open to Stop	Normally Open (NO) Momentarily Close to Run Rev	Bipolar analogue input
15	Open: Stop (disable) Closed: Run (enable)	Open: Forward Closed: Reverse	Open: Decel Ramp 1 (P1-04) Closed: Decel Ramp 2 (P2-25)	Bipolar analogue input
16	Open: Stop (disable) Closed: Run (enable)	Open: Forward Closed: Reverse	Open: Decel Ramp 1 (P1-04) Closed: Decel Ramp 2 (P2-25)	Open: Preset Speed 1 Closed: Preset speed 2
17	Normally Open (NO) Momentarily Close to Run Fwd	Normally Closed (NC) Momentarily Open to Stop	Normally Open (NO) Momentarily Close to Run Rev	Open: Preset Speed 1 Closed: Keypad Speed Ref
18	Open: Stop (disable) Closed: Run (enable)	Digital Input 2	Digital Input 3	Preset Speed Ref
		Open	Open	Preset Speed 1
		Closed	Open	Preset Speed 2
		Open	Closed	Preset Speed 3
19	Open: Stop (disable) Closed: Run (enable)	Open: Bipolar analogue speed ref Closed: Analogue input 2 speed ref	Analogue input 2	Bipolar analogue input
20	Open: Stop (disable) Closed: Run (enable)	Digital Output: Drive Healthy = +24V	Open: Bipolar analogue speed ref Closed: Preset Speed 1	Bipolar analogue input
21	Open: Stop (disable) Closed: Run (enable)	Digital Output: Drive Healthy = +24V	Open: Forward Closed: Reverse	Bipolar analogue input
22	Open: Stop (disable) Closed: Run (enable)	Digital Output: Drive Healthy = +24V	External trip input: Open: Trip, Closed: No Trip	Bipolar analogue input
23	Open: Stop (disable) Closed: Run (enable)	Open: Normal Operation Closed: Fire Mode	Open: Bipolar analogue ref Closed: Preset Speed 1	Bipolar analogue input

7.2. Keypad mode (P1-12 = 1 or 2)

P2-01	Digital input 1 (T2)	Digital input 2 (T3)	Digital input 3 (T4)	Bipolar analogue input (T6)	
0	Open: Stop (disable) Closed: Run (enable)	Closed: remote UP push-button When stopped, closing inputs 2 & 3 simultaneously starts the drive	Closed: remote DOWN push-button	No Function	
1	Open: Stop (disable) Closed: Run (enable)	Closed: remote UP push-button	External trip input: Open: Trip, Closed: No Trip	Closed: remote DOWN push-button	
2	Open: Stop (disable) Closed: Run (enable)	Closed: remote UP push-button	Open: Digital speed ref Closed: Preset speed 1	Open: Forward Closed: Reverse	
3, 9, 13, 14 & 16	Open: Stop (disable) Closed: Run (enable)	Closed: remote UP push-button When stopped, closing inputs 2 & 3 simultaneously starts the drive	Closed: remote DOWN push-button	Open: Forward Closed: Reverse	
10	Open: Stop (disable) Closed: Run (enable)	Open: Digital speed ref Closed: Bipolar analogue speed ref	External trip input Open: Trip, Closed: No Trip	Bipolar analogue input	
11	Open: Stop (disable) Closed: Run (enable)	Open: Digital speed ref Closed: Preset speed 1	External trip input Open: Trip, Closed: No Trip	Open: Forward Closed: Reverse	
12	Open: Stop (disable) Closed: Run (enable)	Open: Preset speed 1 Closed: Digital speed ref	External trip input Open: Trip, Closed: No Trip	Open: Forward Closed: Reverse	
15	Open: Stop (disable) Closed: Run (enable)	Open: Digital speed ref Closed: Preset speed 1	Open: Decel Ramp 1 (P1-04) Closed: Decel Ramp 2 (P2-25)	Open: Forward Closed: Reverse	
17	Open: Stop (disable) Closed: Run (enable)	Open: Digital speed ref Closed: Bipolar analogue speed ref	Open: Digital / Analogue ref Closed: Preset speed 1	Bipolar analogue input	
18	Open: Stop (disable) Closed: Run (enable)	Open: Digital speed ref Closed: Preset speed ref	Digital Input 3	Bipolar analogue input	Preset reference
			Open	Open	Preset Speed 1
			Closed	Open	Preset Speed 2
			Open	Closed	Preset Speed 3
22	Open: Stop (disable) Closed: Run (enable)	Open: Digital speed ref Closed: Analogue input 2 ref	Analogue input 2	Open: Forward Closed: Reverse	
19	Open: Stop (disable) Closed: Run (enable)	Digital Output: Drive Healthy = +24V	Open: Digital speed ref Closed: Preset speed 1	Open: Forward Closed: Reverse	
20, 21	Open: Stop (disable) Closed: Run (enable)	Digital Output: Drive Healthy = +24V	External trip input Open: Trip, Closed: No Trip	Open: Forward Closed: Reverse	
22	Open: Stop (disable) Closed: Run (enable)	Digital Output: Drive Healthy = +24V	External trip input Open: Trip, Closed: No Trip	Open: Forward Closed: Reverse	

NOTE	<p>By default, if the enable signal is present the drive will not Enable until the  button is pressed. To automatically enable the drive when the enable signal is present set P2-19 = 2 or 3.</p> <p>This then disables the use of the  &  buttons</p>
	<p>In keypad mode, the speed can be adjusted using the  &  keys on the built in keypad, or a remote mounted Q-Port Plus keypad, in addition to pushbuttons connected to the digital inputs</p>
	<p>The reverse input only functions under the following conditions:-</p> <ul style="list-style-type: none"> • P1-12 = 1, P2-19 = 2 or 3. P2-35 must not be 2 or 3 • P1-12 = 2. P 2-35 must not be 2 or 3
	<p>The external trip input can be used to connect a motor thermistors by connecting between terminals 1 and 4 Negative Preset Speeds will be inverted if Run Reverse selected.</p>
	<p>When P1-12 =2, the direction of motor can be reversed by</p> <ul style="list-style-type: none"> • Pressing the  button • Closing the reverse input (When using a setting of P2-01 that includes this function) • Using a negative speed reference (e.g. select a preset speed of -10Hz)
	<p>As all these functions can be active at once, ensure the motor always turns in the correct direction.</p>

7.3. User PI control mode (P1-12 = 3)

P2-01	Digital input 1 (T2)	Digital input 2 (T3)	Digital input 3/Analogue input 2 (T4)	Bipolar analogue input (T6)
0..10, 13..16, 18	Open: Stop (disable) Closed: Run (enable)	No Function	Analogue input 2	Bipolar analogue input
11	Open: Stop (disable) Closed: Run (enable)	Open: PID control Closed: Preset speed 1	External trip input Open: Trip, Closed: No Trip	Bipolar analogue input
12	Open: Stop (disable) Closed: Run (enable)	Open: Preset speed 1 Closed: PID control	External trip input Open: Trip, Closed: No Trip	Bipolar analogue input
17	Open: Stop (disable) Closed: Run (enable)	Open: PID Control Closed: Bipolar analogue ref	Analogue input 2	Bipolar analogue input
19	Open: Stop (disable) Closed: Run (enable)	Open: PID Control Closed: Analogue input 2 ref	Analogue input 2	Bipolar analogue input
20, 21	Open: Stop (disable) Closed: Run (enable)	Digital Output: Drive Healthy = +24V	Analogue input 2	Bipolar analogue input
22	Open: Stop (disable) Closed: Run (enable)	Digital Output: Drive Healthy = +24V	External trip input Open: Trip, Closed: No Trip	Bipolar analogue input

NOTE	When P3-05 = 1, Bipolar analogue input controls PID set-point. The feedback must then be connected to Analogue input 2 and P3-10 must be set to 0 (Default setting) The external trip input only functions when the feedback source is the Bipolar analogue input (P3-10 = 1)
-------------	--

For further information on configuring the PID controller for typical feedback applications, please refer to the Advanced User Guide.

7.4. Modbus Control Mode (P1-12=4)

P2-01	Digital input 1 (T2)	Digital input 2 (T3)	Digital input 3 / Analog input 2 (T4)	Bipolar analogue input (T6)	
0..2, 4, 6..9, 13..16, 18	Open: Stop (disable) Closed: Run (enable)	No Function	No Function	Bipolar analogue input (No Function)	
3	Open: Stop (disable) Closed: Run (enable)	Open: Forward Closed: Reverse	Open: Modbus Speed Reference Closed: Preset Speed 1 Reference	Bipolar analogue input (No Function)	
5	Open: Stop (disable) Closed: Run (enable)	Open: Modbus Speed Ref Closed: Preset Speed	Digital Input 3	Bipolar Analogue Input	Preset Speed
			Open	Open	Preset Speed 1
			Closed	Open	Preset Speed 2
			Open	Closed	Preset Speed 3
10	Open: Stop (disable) Closed: Run (enable)	Open: Master Speed Ref Closed: Digital Speed Ref	External trip input Open: Trip, Closed: No Trip	Bipolar analogue input (No Function)	
11	Open: Stop (disable) Closed: Run (enable)	Open: Master Speed Ref Closed: Preset Speed 1	External trip input Open: Trip, Closed: No Trip	Bipolar analogue input (No Function)	
12	Open: Stop (disable) Closed: Run (enable)	Open: Master Speed Ref Closed: Bipolar Analogue Ref	External trip input Open: Trip, Closed: No Trip	Bipolar analogue input (No Function)	
17	Open: Stop (disable) Closed: Run (enable)	Open: Master Speed Ref Closed: Bipolar Analogue Ref	Open: Modbus / Analogue Ref Closed: Preset Speed 1	Bipolar analogue input (No Function)	
19	Open: Stop (disable) Closed: Run (enable)	Open: Master Speed Ref Closed: Analogue Input 2 Ref	Analogue Input 2	Bipolar analogue input (No Function)	
20, 21	Open: Stop (disable) Closed: Run (enable)	Digital Output: Drive Healthy = +24V	Open: Master Speed Ref Closed: Preset Speed 1	Bipolar analogue input (No Function)	
22	Open: Stop (disable) Closed: Run (enable)	Digital Output: Drive Healthy = +24V	External trip input Open: Trip, Closed: No Trip	Bipolar analogue input (No Function)	

8. Troubleshooting

8.1. Fault messages

Fault Code	Description	Corrective Action
P-dEF	Factory Default parameters have been loaded	Press STOP key, drive is ready to configure for particular application
O-I hO-I	Instantaneous over current on drive output. Excess load on the motor. Over temperature on the drive heat-sink	If the fault occurs immediately when enabling the drive, disconnect the motor cable from the output terminals of the drive and restart the drive. If the fault re-occurs with no motor connected, contact your local Fenner Sales Partner. If the drive runs correctly with not motor connected, check the motor, motor cable and any connections or junction boxes for phase – phase and phase – earth short circuits. Wherever possible, motors and connection cables should be checked with a high voltage insulation tester (Megga) prior to connection to the drive. Ensure that no switching devices, such as contactors or local isolators are switching during operation of the drive. Check the motor cable length does not exceed the specified maximum Ensure the motor nameplate parameters are correctly entered, P1-07, P1-08, P1-09. If operating in Vector mode (P4-01 – 0 or 1), also check the motor power factor in P4-05. Ensure an auto-tune has been successfully completed for the connected motor. Check the load mechanically for a jam or stalled condition, or shock loads. Increase the ramp up time in P1-03. If operating in Vector mode (P4-01 – 0 or 1), reduce the speed loop gain in P4-03
I-t-trP	Drive has tripped on overload after delivering >100% of value in P1-08 for a period of time.	Check to see when the decimal points are flashing (drive in overload) and either increase acceleration rate or reduce the load. Check motor cable length is within spec. Ensure the motor nameplate parameters are correctly entered, P1-07, P1-08, and P1-09. If operating in Vector mode (P4-01 – 0 or 1), also check the motor power factor in P4-05. Ensure an auto-tune has been successfully completed for the connected motor. Check the load mechanically to ensure it is free, and no jams, blockages or other mechanical faults exist
OI-b	Brake channel over current	Over current in the brake resistor circuit. Check the cabling to the brake resistor. Check the brake resistor value. Ensure minimum resistance values from the rating tables are observed.
OL-br	Brake resistor overload	Brake resistor overload. Increase deceleration time, reduce load inertia or add further brake resistors in parallel, observing the minimum resistance value for the drive in use.
P5-trP	Fast over current trip	Check wiring to motor, look for ph-ph or ph-Earth short circuit. Check drive ambient temp, additional space or cooling needed? Check drive is not forced into overload.
O_Uo It	Over voltage on DC bus	Supply problem, or increase decel ramp time P1-04.
U_Uo It	Under voltage on DC bus	This occurs routinely when power is switched off. If it occurs during running, check power supply voltage.
O-t	Heat-sink over temperature	Check drive ambient temp. Additional space or cooling required.
U-t	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.
th-FLt	Faulty thermistors on heat-sink.	Refer to your IDL Authorised Distributor.
E-tr iP	External trip (on digital Input 3)	E-trip requested on digital input 3. Normally closed contact has opened for some reason. If motor thermistors is connected check if the motor is too hot.
SC-trP	Comms. loss trip	Check communication link between drive and external devices. Make sure each drive in the network has its unique address.
P-LOSS	Input phase loss trip	Drive intended for use with a 3 phase supply has lost one input phase. Check incoming supply and fuses.
Ph-I b	Phase Imbalance	Mains incoming supply voltage has an imbalance of >3% for over 30 seconds. Check incoming supply and fuses
dRA-R-F	Internal memory fault.	Parameters not saved, defaults reloaded. Try again. If the problem re-occurs, refer to your local Invertek Sales Partner.
At-F01	Auto-tune Failed	Measured motor stator resistance varies between phases. Ensure the motor is correctly connected and free from faults. Check the windings for correct resistance and balance.
At-F02		Measured motor stator resistance is too large. Ensure the motor is correctly connected and free from faults. Check that the power rating corresponds to the power rating of the connected drive.
At-F03		Measured motor inductance is too low. Ensure the motor is correctly connected and free from faults.
At-F04		Measured motor inductance is too large. Ensure the motor is correctly connected and free from faults. Check that the power rating corresponds to the power rating of the connected drive.
At-F05		Measured motor parameters are not convergent. Ensure the motor is correctly connected and free from faults. Check that the power rating corresponds to the power rating of the connected drive.
SP in-F	Spin Start Failure	Spin start function (P2-18=1) failed to detect motor speed Check motor and connections. Ensure motor speed is less than maximum speed (P1-01). Make sure motor base frequency (P1-09) is <100Hz
4-20 F	4-20mA Input Signal Loss	The level of the 4-20mA signal applied to analogue input 2 (Terminal 4) has dropped below the minimum threshold of 3mA. Check for wiring or signal transducer faults

9. Technical data

9.1. Environmental

Operational ambient temperature range: -10 ... 50°C, Frost and condensation free

Storage ambient temperature range: -40 ... 60°C

Maximum altitude: 2000m. De-rate above 1000m: 1% / 100m

Maximum humidity: 95%, non-condensing

9.2. Rating tables

200-240V ±10% - 1 Phase Input – 3 Phase Output with Internal RFI Filter												
Part Number	kW	HP	Frame Size	Nominal Input Current (Amps)	Fuse or MCB (type B) (Amps)	Supply Cable Size (mm ²)	Nominal Output Current (Amps)	150% Output Current 60 secs (Amps)	Motor Cable Size (mm ²)	Max Motor Cable Length (m)	Min Brake Resistor Value (Ω)	
572H21P5	1.5	2	2	19.3	20	4	7	10.5	1.5	100	33	
572H22P2	2.2	3	2	28.8	32	6	10.5	15.75	1.5	100	22	
NOTE	For cUL compliance, fuse type Bussmann KTN-R / KTS-R or equivalent must be used											

200-240V ±10% - 3 Phase Input – 3 Phase Output with Internal RFI Filter												
Part Number	kW	HP	Frame Size	Nominal Input Current (Amps)	Fuse or MCB (type B) (Amps)	Supply Cable Size (mm ²)	Nominal Output Current (Amps)	150% Output Current 60 secs (Amps)	Motor Cable Size (mm ²)	Max Motor Cable Length (m)	Min Brake Resistor Value (Ω)	
572H31P5	1.5	2	2	9.2	16	2.5	7	10.5	1.0	100	33	
572H32P2	2.2	3	2	13.7	20	4	10.5 (9)	15.75 (13.5)	1.5	100	22	
572H33P0	3	4	3	16.1	20	4	14	21	2.5	100	15	
572H34P0	4	5	3	17.3	32	6	18	27	2.5	100	15	
572H35P5	5.5	7.5	3	25.0	40	6	25 (24)	37.5 (36)	4	100	15	
572H37P5	7.5	10	4	46.6	50	10	39	58.5	10	100	6	
572H3011	11	15	4	54.1	63	16	46	69	10	100	6	
572H3015	15	20	4	69.6	80	25	61	91.5	16	100	6	
572H3018	18.5	25	5	76.9	80	25	72	108	16	100	3	
572H3022	22	30	5	92.3	100	35	90	135	25	100	3	
572H3030	30	40	5	116.9	125	50	110	165	35	100	3	
572H3037	37	50	5	150.2	160	70	150	225	55	100	3	
572H3045	45	60	5	176.5	200	90	180	270	70	100	3	
NOTE	Values shown in brackets are the maximum for UL applications For cUL compliance, fuse type Bussmann KTN-R / KTS-R or equivalent must be used											

380-480V±10% - 3 Phase Input – 3 Phase Output with Internal RFI Filter

Part Number	kW	HP	Frame Size	Nominal Input Current (Amps)	Fuse or MCB (type B) (Amps)	Supply Cable Size (mm ²)	Nominal Output Current (Amps)	150% Output Current 60 secs (Amps)	Motor Cable Size (mm ²)	Max Motor Cable Length (m)	Min Brake Resistor Value (Ω)
572H41P5	1.5	2	2	5.4	6	1	4.1	6.2	1	100	47
572H42P2	2.2	3	2	7.6	10	1.5	5.8	8.5	1.5	100	47
572H44P0	4	5	2	12.4	16	2.5	9.5	14.3	1.5	100	33
572H45P5	5.5	7.5	3	16.1	20	2.5	14	21	2.5	100	22
572H47P5	7.5	10	3	17.3	20	4	18	27	2.5	100	22
572H4011	11	15	3	25	25	4	25 (24)	37.5 (36)	4	100	22
572H4015	15	20	3	32.9	32	6	30	45	6	100	22
572H4018	18.5	25	4	46.6	50	10	39	58.5	10	100	12
572H4022	22	30	4	54.1	63	16	46	69	10	100	12
572H4030	30	40	4	69.6	80	25	61	91.5	16	100	12
572H4037	37	50	4	76.9	80	25	72	108	16	100	12
572H4045	45	60	5	92.3	100	35	90	135	25	100	6
572H4055	55	75	5	116.9	125	50	110	165	35	100	6
572H4075	75	100	5	150.2	160	70	150	225	55	100	6
572H4090	90	150	5	176.5	200	90	180	270	70	100	6
572H4110	110	160	6	217.2	250	120	202	303	90	100	6
572H4132	132	200	6	255.7	315	120	240	360	120	100	6
572H4160	160	250	6	302.4	315	170	300	450	170	100	6

NOTE

Values shown in brackets are the maximum for UL applications
For cUL compliance, fuse type Bussmann KTN-R / KTS-R or equivalent must be used

9.3. Maximum supply ratings for UL compliance:

Drive rating	Maximum supply voltage	Maximum supply short-circuit current
230V ratings	0.37kW to 18.5kW	240V rms (AC)
230V ratings	22kW to 90kW	240V rms (AC)
400V ratings	0.75kW to 37kW	500V/600V rms (AC)
400V ratings	45kW to 132kW	500V/600V rms (AC)
400V ratings	160kW	500V/600V 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.

10. Modbus Communications

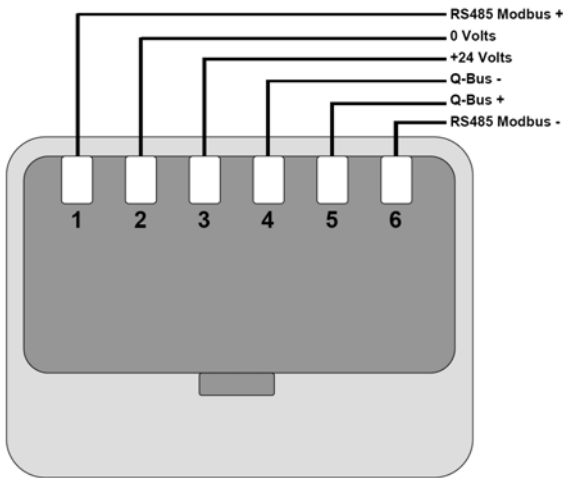
10.1. Introduction

The QD:VT can be connected to a Modbus RTU network via the RJ11 connector on the front of the drive.

10.2. Modbus RTU Specification

Protocol	Modbus RTU
Error check	CRC
Baud rate	9600bps, 19200bps, 38400bps, 57600bps, 115200bps (default)
Data format	1 start bit, 8 data bits, 1 stop bit, no parity.
Physical signal	RS 485 (2-wire)
User interface	RJ11 (see section 4.4 for more information)

10.3. RJ11 Connector Configuration



10.4. Modbus Telegram Structure

The QD:VT supports Master / Slave Modbus RTU communications, using the 03 Read Holding Registers and 06 Write Single Holding Register commands. Many Master devices treat the first Register address as Register 0, therefore it may be necessary to convert the Register Numbers detail in section 10.5 by subtracting 1 to obtain the correct Register address.

The telegram structure is as follows:-

Command 03 – Read Holding Registers

Master Telegram	Length
Slave Address	1 Byte
Function Code (03)	1 Byte
1 st Register Address	2 Bytes
No. Of Registers	2 Bytes
CRC Checksum	2 Bytes

Slave Response	Length
Slave Address	1 Byte
Starting Address	1 Byte
1 st Register Value	2 Bytes
2 nd Register Value	2 Bytes
CRC Checksum...	2 Bytes

Command 06 – Write Single Holding Register

Master Telegram	Length
Slave Address	1 Byte
Function Code (06)	1 Byte
Register Address	2 Bytes
Value	2 Bytes
CRC Checksum	2 Bytes

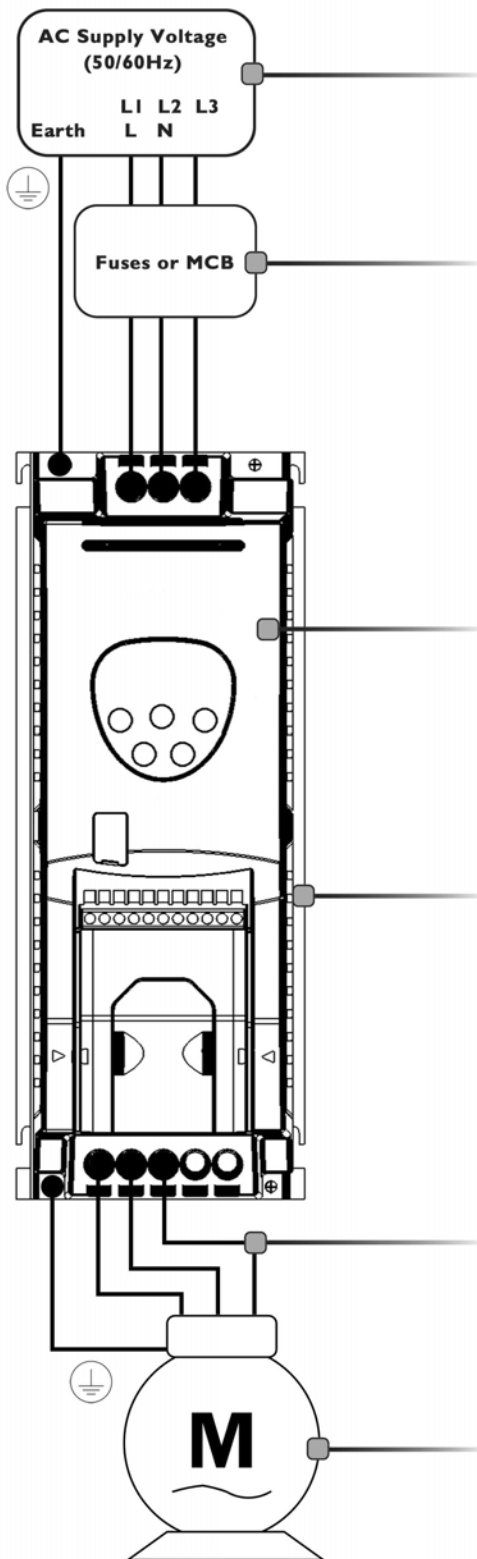
Slave Response	Length
Slave Address	1 Byte
Function Code (06)	1 Byte
Register Address	2 Bytes
Register Value	2 Bytes
CRC Checksum	2 Bytes

10.5. Modbus Register Map

Register Number	Par.	Type	Supported Commands	Function		Range	Explanation
1	-	R/W	03,06	Drive Control Command		0..3	16 Bit Word. Bit 0: Low=Stop, High=Run Enable Bit 1: Low=No Function, High=Fault Reset Bit 2: Low=Decel Ramp 1 (P1-04), High=Decel Ramp 2
2	-	R/W	03,06	Modbus Speed reference set-point		0..20000	Set-point frequency x10, e.g. 100 = 10.0Hz
3	-	R/W	03,06	Torque reference		0..2000	Torque Setpoint %x10, e.g. 1000 = 100.0%
4	-	R/W	03,06	Acceleration and Deceleration Time		0..255	Ramp time in seconds x 10, e.g. 250 = 25 seconds
5	<i>Reserved</i>						
6	-	R	03	Error code	Drive status		Low Byte = Drive Error Code, see table below High Byte = Drive Status as follows:- 0: Drive Stopped 1: Drive Running 2: Drive Tripped
7		R	03	Output Motor Frequency		0..20000	Output frequency in Hz x10, e.g. 100 = 10.0Hz
8		R	03	Output Motor Current		0..6000	Output Motor Current in Amps x10, e.g. 10 = 1.0 Amps
9	P0-13	R	03	Output Motor Torque		0..2000	Output Motor Torque %x10, e.g. 1000 = 100.0%
10		R	03	Output Motor Power		0..3200	Output Motor Power in kW x10, e.g. 100 = 10.0kW
11	-	R	03	Digital input status		0..15	Indicates the status of the 4 digital inputs Lowest Bit = 1 Input 1
21	P0-01	R	03	Bipolar analogue input value		0..1000	Analogue input % of full scale x10, (1000 = 100%)
22	P0-02	R	03	2 nd analogue input value		0..1000	Analogue input % of full scale x10, (1000 = 100%)
40	P0-20	R	03	DC bus voltage		0..1000	DC Bus Voltage in Volts
41	P0-21	R	03	Drive temperature		0..100	Drive heat-sink temperature in °C
42	P0-22	R	03	Supply voltage L1		0..660	L1 – L2 Supply Voltage
43	P0-23	R	03	Supply voltage L2		0..660	L2 – L3 Supply Voltage
44	P0-24	R	03	Supply voltage L3		0..660	L3 – L1 Supply Voltage
45	P0-25	R	03	Estimated rotor speed			Internal Speed Value
46	P0-26	R	03	kWh meter		0..1000	Energy consumed in kWh
47	P0-27	R	03	MWh meter		0..65535	Energy consumed in MWh

Further registers are available; see the QD:VT Advanced User Guide for details.

EASY START-UP GUIDE



Supply Voltage

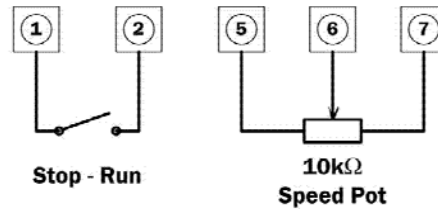
- 200 – 240 Volts +/- 10%, 1 or 3 Phase
 - 380 – 400 Volts +/- 10%, 3 Phase
- See Page 5

Fuses or MCB & Cable Sizes

- Check drive rating information on page 27

Keypad Operation – see page 14

Control Terminal Wiring – based on default settings:-



Motor Cable Sizes

- Check drive rating information on page 27

Motor Connections

- Check for Star or Delta (see page 10)

Motor Nameplate Details

- Enter the motor rated voltage (V) in P1-07
- Enter the motor rated current (A) in P1-08
- Enter the motor rated frequency (Hz) in P1-09



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