User guide

SRC 311 - Pumpdrive with SmartRun™ functionality, dedicated for waste water pump station

FLYGT
a xylem brand

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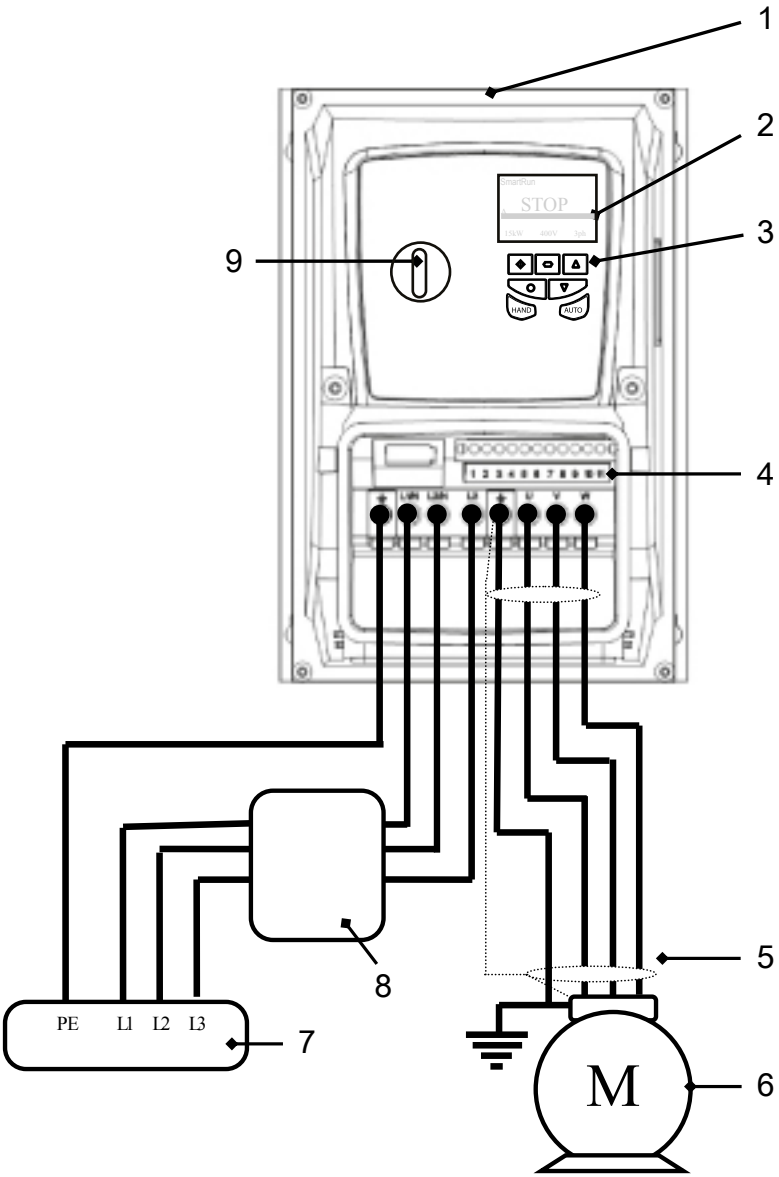
Introduction and Safety

SRC 311

Frame Sizes 2 and 3



1. Mechanical mounting, see *Mechanical Installation* (page 7).
2. Display (Status, Diagnostics, and Programming).
3. Keypad Operation see *Managing the Keypad* (page 15).
4. Control Terminal Configuration based on factory settitngs Safe Torque Off (STO) Link the terminals as shown above through the emergency stop circuit contacts.
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5. Motor Cable Sizes, see *Output power and current ratings* (page 20).

6. Motor Connections, Check for Star or Delta connection according to the motor voltage rating.
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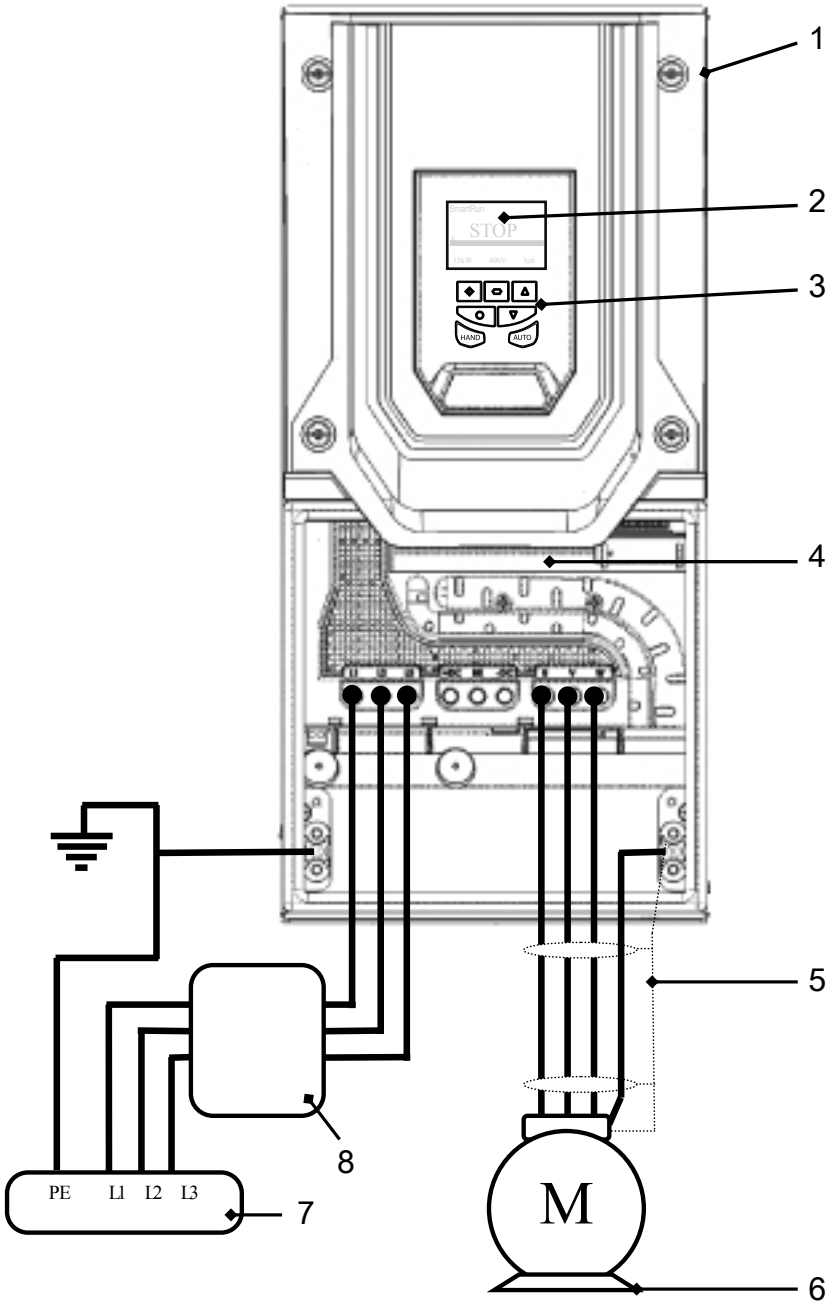
   - Motor Rated Voltage: P1-07
   - Motor Rated Current: P1-08
   - Motor Rated Frequency: P1-09
   - Motor Rated Speed (Optional): P1-10
7. Fuses or MCB, see *Output power and current ratings* (page 20).
8. AC Supply Connection, see *Output power and current ratings* (page 20).
   - 200 – 240 Volts + / - 10%: 1 / 3 Phase
   - 380 – 380 Volts + / - 10%: 3 Phase
9. Applies to Switched version only In-built Controls: Power On / Off

Frame Sizes 4 to 6



Electromagnetic Compatibility

All SRC 311 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 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 the EMC Directive 2004/108/EC. When using an SRC 311 with an internal or optional external filter, compliance with the following EMC Categories, as defined by EN61800-3:2004 can be achieved:

Drive Type / Rating	EMC Category		
	Cat C1	Cat C2	Cat C3
1 Phase, 230 Volt Input SRC311-X-2-XXXXX-XX	No additional filtering required Use shielded motor cable		
3 Phase, 400 Volt Input SRC311-X-4-XXXXX-XX	Use External Filter	No additional filtering required	
	Use screened motor cable		
Note	For motor cable lengths greater than 100 m, an output dv / dt filter must be used, please refer to the local Sales Partner for further details		

Important Safety Information

DANGER: Indicates a risk of electric shock, which, if not avoided, could result in damage to the equipment and possible injury or death.

DANGER: Indicates a potentially hazardous situation other than electrical, which if not avoided, could result in damage to property.

	This variable speed drive product is intended for professional incorporation into complete equipment or systems as part of a fixed installation. If installed incorrectly it may present a safety hazard. The SRC 311 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. Only qualified electricians are allowed to install and maintain this product.
	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 SRC 311, including the specified environmental limitations.
	Do not perform any flash test or voltage withstand test on the SRC 311. Any electrical measurements required should be carried out with the SRC 311 disconnected.
	Electric shock hazard! Disconnect and ISOLATE the SRC 311 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. Always ensure by using a suitable multimeter that no voltage is present on any drive power terminals prior to commencing any work.
	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.
	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. Suitably rated fuses or MCB should be fitted in the mains supply to the drive, according to any local legislation or codes.
	Do not carry out any work on the drive control cables whilst power is applied to the drive or to the external control circuits.

⚠	Within the European Union, all machinery in which this product is used must comply with Directive 98/37/EC, Safety of Machinery. In particular, the machine manufacturer is responsible for providing a main switch and ensuring the electrical equipment complies with EN60204-1.
	The level of integrity offered by the SRC 311 control input functions (excluding the 'Safe Torque Free Input') – 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.
	The driven motor can start at power up if the enable input signal is present.
	The STOP function does not remove potentially lethal high voltages. ISOLATE the drive and wait 10 minutes before starting any work on it. Never carry out any work on the Drive, Motor or Motor cable whilst the input power is still applied.
	The SRC 311 can be programmed to operate the driven motor at speeds above or below the speed achieved when connecting the motor directly to the mains supply. Obtain confirmation from the manufacturers of the motor and the driven machine about suitability for operation over the intended speed range prior to machine start up.
	Do not activate the automatic fault reset function on any systems whereby this may cause a potentially dangerous situation.
	The SRC 311 has an Ingress Protection rating of IP55, and are intended for indoor use only
	When mounting the drive, ensure that sufficient cooling is provided. Do not carry out drilling operations with the drive in place, dust and swarf from drilling may lead to damage.
	The entry of conductive or flammable foreign bodies should be prevented. Flammable material should not be placed close to the drive
	Relative humidity must be less than 95% (non-condensing).
	Ensure that the supply voltage, frequency and no. of phases (1 or 3 phase) correspond to the rating of the SRC 311 as delivered.
	Never connect the mains power supply to the Output terminals U, V, W.
	Do not install any type of automatic switchgear between the drive and the motor
	Wherever control cabling is close to power cabling, maintain a minimum separation of 100 mm and arrange crossings at 90 degrees Ensure that all terminals are tightened to the appropriate torque setting
	Do not attempt to carry out any repair of the SRC 311. In the case of suspected fault or malfunction, contact your local Sales Partner for further assistance.

Installation

Mechanical Installation

General

- The SRC 311 should be mounted in a vertical position only on a flat, flame resistant vibration free mounting using the integral holes.
- The SRC 311 must be installed in a pollution degree 1 or 2 environment only.
- Do not mount flammable material close to the SRC 311
- Ensure that the minimum cooling air gaps, as detailed in section 0 are left clear
- Ensure that the ambient temperature range does not exceed the permissible limits for the SRC 311 given in *Environmental* (page 19).
- Provide suitable clean, moisture and contaminant free cooling air sufficient to fulfil the cooling requirements of the SRC 311 according to *Environmental* (page 19).

Before Installation

- Carefully Unpack the SRC 311 and check for any signs of damage. Notify the shipper immediately if any exist.
- Check the drive rating label to ensure it is of the correct type and power requirements for the application.
- Store the SRC 311 in its box until required. Storage should be clean and dry and within the temperature range –40°C to +60°C

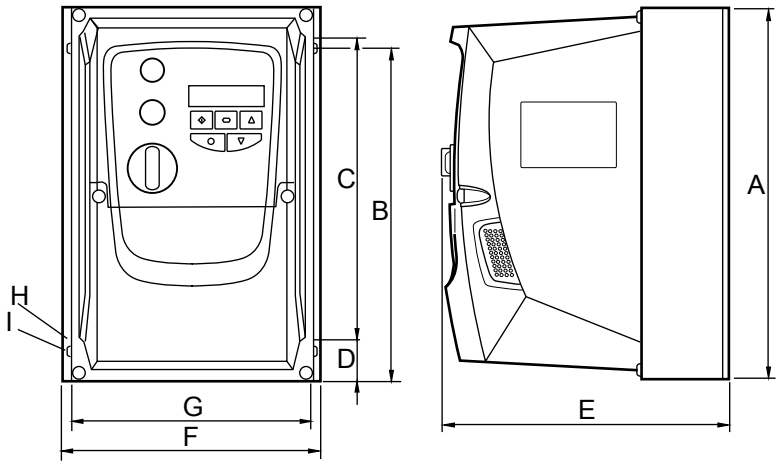
UL-Compliant Installation

Note the following for UL-compliant installation:

- The drive can be operated within an ambient temperature range as stated in *Environmental* (page 19).
- Installation in a pollution degree 2 environmant is permissible
- UL Listed ring terminals / lugs must be used for all bus bar and grounding connections

Mechanical Dimensions and Mounting

Frame Sizes 2 - 3



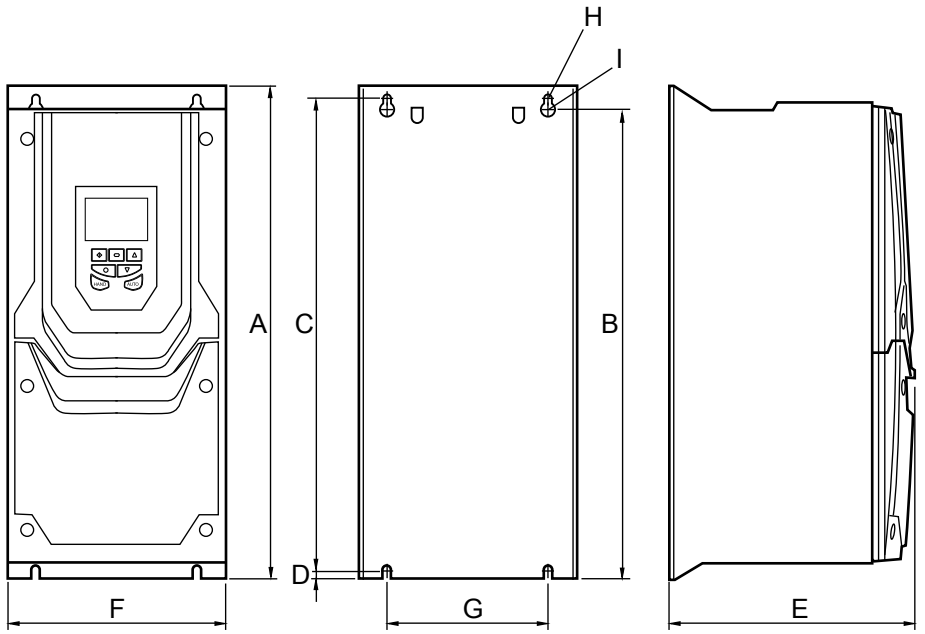
Drive Size	A		B		C		D		E		F		G		H		I	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
2	257.0	10.12	220.0	8.67	200.0	7.87	28.5	1.12	238	9.37	188.0	7.40	176.0	6.93	4.2	0.17	8.5	0.33

Drive Size	A		B		C		D		E		F		G		H		I	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
3	310.0	12.20	276.5	10.89	251.5	9.90	33.4	1.31	256	10.08	210.5	8.29	197.5	7.78	4.2	0.17	8.5	0.33

Control Terminal Torque Settings: All Sizes: 0.8 Nm (7 lb-in)

Power Terminal Torque Settings: All Sizes: 1 Nm (8.85 lb-in)

Frame Size 4 - 6



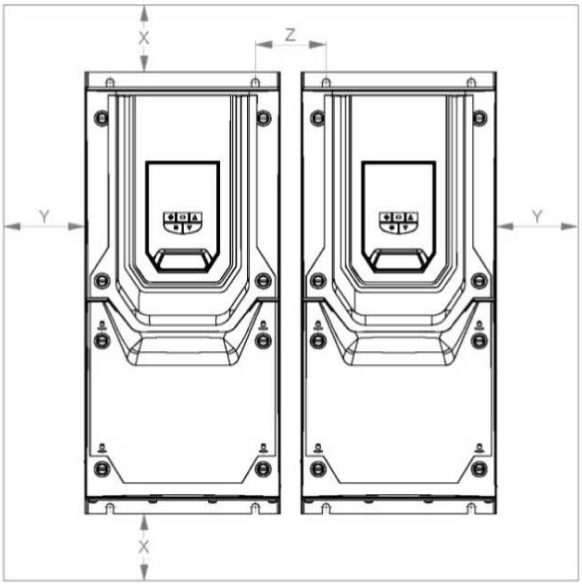
Drive Size	A		B		C		D		E		F		G		H		I	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
4	440	17.32	418	16.46	423	16.65	8	0.315	230	9.06	173	6.81	110	4.33	4.25	0.167	7.5	0.295
5	540	21.26	515	20.28	520	20.47	8	0.315	270	10.63	235	9.25	175	6.89	4.25	0.167	7.5	0.295
6	865	34.06	830	32.68	840	33.07	10	0.394	340	13.39	290	11.42	200	7.87	5.5	0.217	11	0.295

Control Terminal Torque Settings:	All Sizes	0.8 Nm (7 lb-in)
Power Terminal Torque Settings:	Frame Size 4:	1.2 – 1.5 Nm
	Frame Size 5:	2.5 – 4.5 Nm
	Frame Size 6:	8 Nm

Guidelines for Mounting

- Before mounting the drive, ensure that the chosen location meets the environmental condition requirements for the drive shown in *Environmental* (page 19).
- The drive must be mounted vertically, on a suitable flat surface

- The minimum mounting clearances as shown in the table below must be observed
- The mounting site and chosen mountings should be sufficient to support the weight of the drives

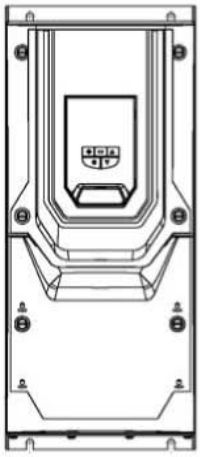
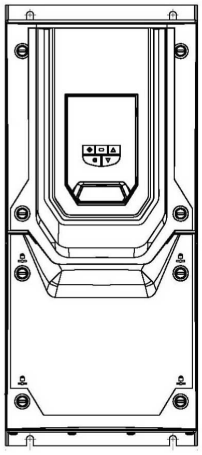


Drive Size	X - Above and Below		Y - Either Side	
	mm	in	mm	in
4	200	7.87	10	0.394
5	200	7.87	10	0.394
6	200	7.87	10	0.394

Typical drive heat losses are 3% of operating load conditions.

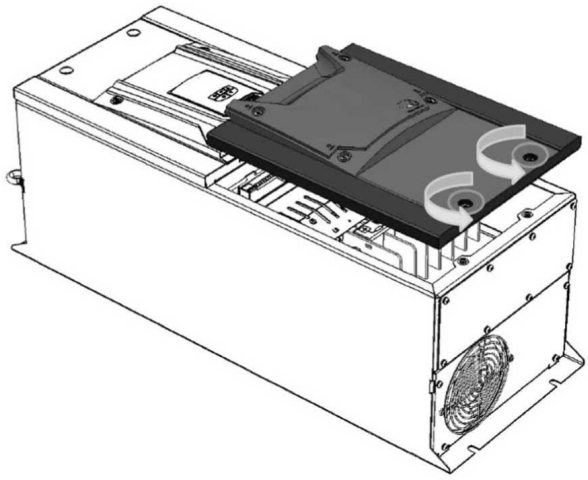
Above are guidelines only and the operating ambient temperature of the drive MUST be maintained at all times.

Removing the Terminal Cover

Frame Size 4	Frame Size 5
	
Using a suitable flat blade screwdriver, rotate the two retaining screws indicated until the screw slot is vertical.	Using a suitable flat blade screwdriver, rotate the four retaining screws indicated until the screw slot is vertical.

Terminal Cover Release Screws

Frame Size 6



Remove the two screws indicated, lift the cover forwards and off. To refit the cover, slide the top locating lugs upwards under the top cover, then re-fasten the lower cover screws

Electrical Installation

Grounding the Drive

DANGER: This manual is intended as a guide for proper installation. Xylem Water Solution AB 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.

DANGER: This SRC 311 contains high voltage capacitors that take time to discharge after removal of the main supply. Before working on the drive, ensure isolation of the main 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.

DANGER: 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 SRC 311 should be individually connected DIRECTLY to the site ground bus bar (through the filter if installed). SRC 311 ground connections should not loop from one drive to another, or to, or from any other equipment. Ground loop impedance must confirm 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 SRC 311 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 SRC 311

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.

Wiring Precautions

Connect the SRC 311 according to *Drive and Motor Connection* (page 12) and *Motor Terminal Box Connections* (page 12), 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 *Motor Terminal Box Connections* (page 12).

It is recommended that the power cabling should be 4-core PVC-insulated screened cable, laid in accordance with local industrial regulations and codes of practice.

Incoming Power Connection

- For a single phase supply, power should be connected to L1/L, L2/N.
- For 3 phase supplies power should be connected to L1, L2, and L3. Phase sequence is not important.
- For compliance with CE and C Tick EMC requirements, a symmetrical shielded cable is recommended.

- A fixed installation is required according to IEC61800-5-1 with a suitable disconnecting device installed between the SRC 311 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 dimensions according to any local codes or regulations. Guideline dimensions are given in *Output power and current ratings* (page 20).
- Suitable fuses to provide wiring protection of the input power cable should be installed in the incoming supply line, according to the data in *Output power and current ratings* (page 20). The fuses must comply with any local codes or regulations in place. In general, type gG (IEC 60269) or UL type T 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 utilized in place of fuses, providing that the clearing capacity is sufficient for the installation.
- 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 SRC 311 Power terminals as defined in IEC60439-1 is 100kA.
- An optional Input Choke is recommended to be installed in the supply line for drives 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)
  - The power supply to the drive is via a busbar and brush gear system (typically overhead Cranes).
- In all other installations, an input choke is recommended to ensure protection of the drive against power supply faults.
- SRC 311 models in frame sizes 4 to 6 are factory fitted with an Input choke as standard.

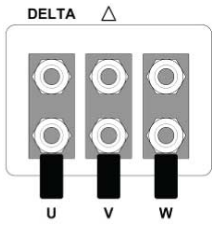
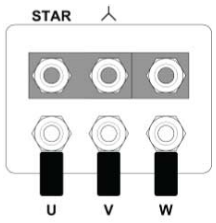
Drive and Motor Connection

- The motor should be connected to the SRC 311 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 utilized, 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 SRC 311 earth terminals.
- For compliance with the European EMC directive, a suitable screened (shielded) cable should be used. Braided or twisted type screened cable where the screen covers at least 85% of the cable surface area, designed with low impedance to HF signals are recommended as a minimum. Installation within a suitable steel or copper tube is generally also acceptable.
- The cable screen should be terminated at the motor end using an EMC type gland allowing connection to the motor body through the largest possible surface area
- Where drives are mounted in a steel control panel enclosure, the cable screen may be terminated directly to the control panel using a suitable EMC clamp or gland, as close to the drive as possible.
- For IP55 drives, connect the motor cable screen to the internal ground clamp

Motor Terminal Box Connections

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

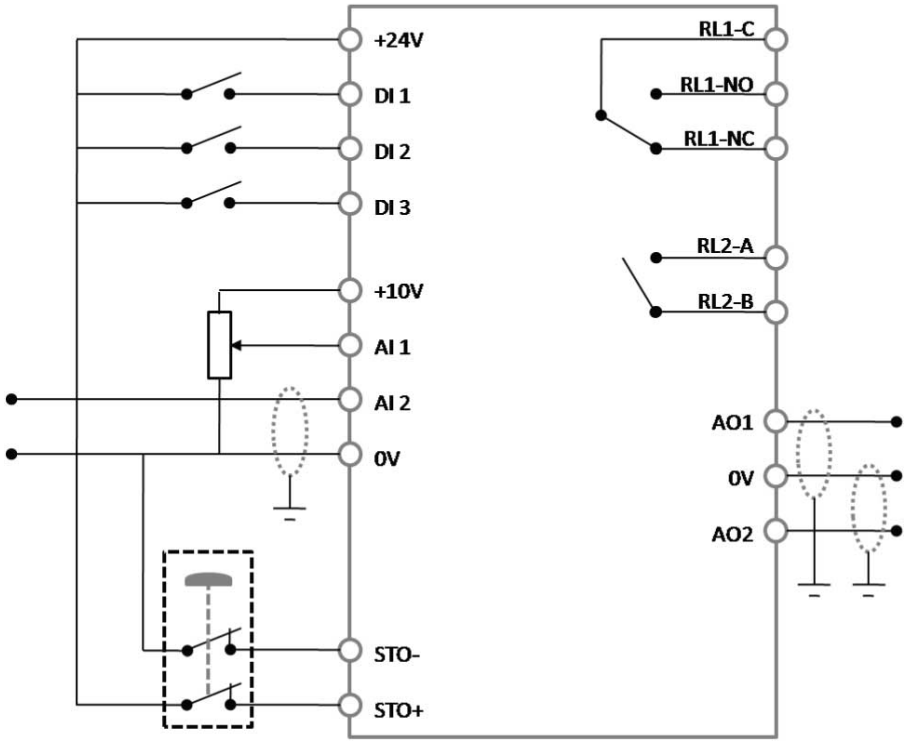
This is indicated on the nameplate of the motor This operational voltage is normally selected when installing the motor by selecting either STAR or DELTA connection. STAR always gives the higher of the two voltage ratings.

230	230 / 400	Delta	
400	400 / 690		
400	230 / 400	Star	

Control Terminal Wiring

- All analog 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
- Maximum control terminal tightening torque is 0.5Nm

Control Terminals Connection Diagram



Control Terminal Connections

Main Terminal Strip

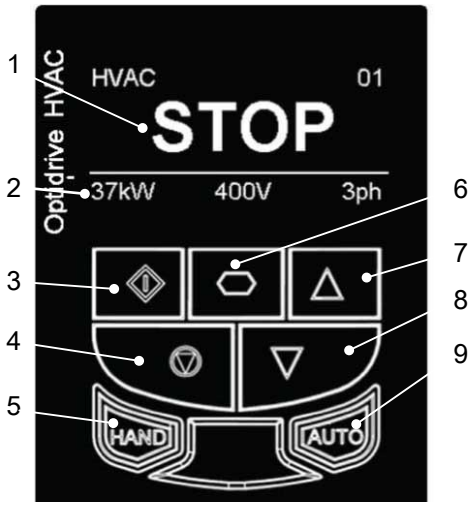
1	+24V	+ 24V User Output (Input)	100mA User Output or +24V back up supply.
2	DI 1	Input 1	Digital 8 – 30 Volt DC
3	DI 2	Input 2	Digital 8 – 30 Volt DC
4	DI 3	Input 3	Digital 8 – 30 Volt DC
5	+10V	+ 10 Volt User Output	10mA
6	AI 1	Input 4	Analog Input 1, -10 to +10V, 0 / 4 to 20mA
7	0V	0 Volt Common	
8	AO1	Output 1	1st Analog 4 to 20mA
9	0V	0 Volt Common	
10	AI 2	Input 5	0 / 4 to 20mA
11	AO2	Output 2	Digital Output, 0 to 10V
12	STO+	Drive hardware inhibit	"Safe" 24V input - must be linked to ext +24 Volt (18 – 30 Volt) DC to enable power stage
13	STO-	Inhibit 0V input	0V return for the 24V "Safe" (STO)
Additional Terminal Strip			
14	RL1-C	Relay Output 1 Common	Relay contacts, 250V AC, 30V DC, 5A
15	RL1-NO	Relay Output 1 NO	Relay contacts, 250V AC, 30V DC, 5A
16	RL1-NC	Relay Output 1 NC	Relay contacts, 250V AC, 30V DC, 5A
17	RL2-A	Relay Output 2 Common	Relay contacts, 250V AC, 30V DC, 5A
18	RL2-B	Relay Output 2 NO	Relay contacts, 250V AC, 30V DC, 5A

System Description

Managing the Keypad

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

Figure 1: Keypad Layout and Function



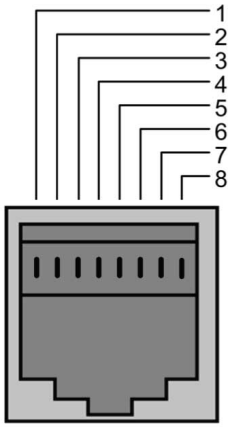
1. Sump level, unless drive is turned off, then it says "Stop"
2. Operating information, frequency and current
3. Start button, used to start the drive or to toggle between ON and Standby
4. Stop button, used to turn off or set the drive to Standby
5. Hand button, used to place the drive in Hand mode
6. Navigate Button Used to display real-time information, access and exit parameter edit mode and to store parameter changes
7. Up Button Used to increase speed in Hand mode to increase parameter values in parameter edit mode
8. Down Button Used to decrease speed Hand mode or to decrease parameter values in parameter edit mode
9. Auto Button Used to place drive in Auto mode

Serial Communications

RS-485 Communications

SRC 311 has an RJ45 connector located within the wiring enclosure of the drive. This connector allows the user to set up a drive network via a wired connection. The connector contains two independent RS485 connections, one for the Optibus Protocol and one for Modbus RTU / BACnet. Both connections can be used simultaneously.

The electrical signal arrangement of the RJ45 connector is shown as follows:



1. Not Used
2. Not Used
3. 0 Volt
4. Optibus / Remote Keypad / PC Connection -
5. Optibus / Remote Keypad / PC Connection +
6. +24 Volt Remote Keypad Power Supply
7. RS 485- Modbus RTU / BACnet
8. RS 485+ Modbus RTU / BACnet

WARNING: This is not an Ethernet connection. Do not connect directly to an Ethernet port.

The Modbus interface allows connection to a Modbus RTU network as described below.

Modbus RTU Communications

Modbus Telegram Structure

The SRC 311 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 0 by subtracting 1 to obtain the correct Register address. The telegram structure is as follows

Table 1: Command 03 – Read Holding Registers

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

Table 2: Command 06 – Write Single Holding Register

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

Master Telegram	Length			Slave Response	Length	
CRC Checksum	2	Bytes		CRC Checksum	2	Bytes

Modbus Control & Monitoring Registers

The following is a list of accessible Modbus Registers available in the SRC 311.

- Registers 1 and 2 can be used to control the drive providing that Modbus RTU is selected as the primary command source (P1-12 = 4)
- Register 4 can be used to control the acceleration and deceleration rate of the drive providing that Fieldbus Ramp Control is enabled (P5-07 = 1)
- Registers 6 to 24 can be read regardless of the setting of P1-12

Register Number	Upper Byte	Lower Byte	Read/Write	Notes
1	Command Control Word		R/W	Command control word used to control the SRC 311 when operating with Modbus RTU. The Control Word bit functions are as follows : • Bit 0 : Run/Stop command. Set to 1 to enable the drive. Set to 0 to stop the drive. • Bit 1 : Fast stop request. Set to 1 to enable drive to stop with 2nd deceleration ramp. • Bit 2 : Reset request. Set to 1 in order to reset any active faults or trips on the drive. This bit must be reset to zero once the fault has been cleared. • Bit 3 : Coast stop request. Set to 1 to issue a coast stop command.
2	Command Speed Reference		R/W	Set-point must be sent to the drive in Hz to one decimal place, e.g. 500 = 50.0Hz
3	Command Torque Reference		R/W	Set-point must be sent to the drive in % to one decimal place, e.g. 2000 = 200.0%
4	Command Ramp times		R/W	This register specifies the drive acceleration and deceleration ramp times used when Fieldbus Ramp Control is selected (P5-08 = 1) irrespective of the setting of P1-12. The input data range is from 0 to 60000 (0.00s to 600.00s)
6	Error code	Drive status	R	This register contains 2 bytes. The Lower Byte contains an 8 bit drive status word as follows: • Bit 0 : 0 = Drive Disabled (Stopped), 1 = Drive Enabled (Running) • Bit 1 : 0 = Drive Healthy, 1 = Drive Tripped The Upper Byte will contain the relevant fault number in the event of a drive trip. Refer to section 14.1 for a list of fault codes and diagnostic information
7	Output Frequency		R	Output frequency of the drive to one decimal place, e.g.123 = 12.3 Hz
8	Output Current		R	Output current of the drive to one decimal place, e.g.105 = 10.5 Amps
9	Output Torque		R	Motor output torque level to one decimal place, e.g. 474 = 47.4 %
10	Output Power		R	Output power of the drive to two decimal places, e.g.1100 = 11.00 kW

Register Number	Upper Byte	Lower Byte	Read/Write	Notes
11	Digital Input Status		R	Represents the status of the drive inputs where Bit 0 = Digital Input 1 etc
20	Analog 1 Level		R	Analog Input 1 Applied Signal level in % to one decimal place, e.g. 1000 = 100.0%
21	Analog 2 Level		R	Analog Input 2 Applied Signal level in % to one decimal place, e.g. 1000 = 100.0%
22	Pre Ramp Speed Reference		R	Internal drive frequency set-point
23	DC bus voltages		R	Measured DC Bus Voltage in Volts
24	Drive temperature		R	Measured Heatsink Temperature in °C

Modbus Parameter Access

All User Adjustable parameters (Groups 1 to 5) are accessible by Modbus, except those that would directly affect the Modbus communications, e.g.

- P5-01 Drive Fieldbus Address
- P5-03 Modbus RTU Baud Rate
- P5-04 Modbus RTU Data Format

All parameter values can be read from the drive and written to, depending on the operating mode of the drive – some parameters cannot be changed whilst the drive is enabled for example.

When accessing a drive parameter via Modbus, the Register number for the parameter is the same as the parameter number, E.g. Parameter P1-01 = Modbus Register 101. Modbus RTU supports sixteen bit integer values, hence where a decimal point is used in the drive parameter, the register value will be multiplied by a factor of ten, E.g. Read Value of P1-01 = 500, therefore this is 50.0Hz.

For further details on communicating with SRC 311 using Modbus RTU, please refer to your local Sales Partner.

Technical Reference

Environmental

Ambient temperature range, Operational	-10 … 40°C Max 50°C with de-rating
Ambient temperature range, Storage	-40 °C … 60 °C
Max altitude for rated operation	1000 m
Derating above 1000 m	1% per 100 m above 1000 m Maximum 2000 m with UL approval Maximum 4000 m without UL approval
Relative Humidity	< 95% (non condensing)

Input voltage

Model Number	Supply Voltage	Phases	Frequency (Hz)
SRC311-X-X-XXXXX-XX	200 – 240 V +10/-15%	1	50, 60
		3	
	380 – 480 V +10/-15%	3	

Depending upon the model and power rating, the drives are designed for direct connection to the following supplies

All SRC 311 monitor phase imbalance. A phase imbalance of > 3% result in SRC 311 tripping. For input supplies which have supply imbalance greater than 3% an input line reactor is recommended. Alternatively, SRC 311 can be operated as a single phase supply drive with 50% de-rating.

Maximum supply ratings for UL- compliance

The table describe the drivers suitable for a circuit capable of delivering specified maximum specified short-circuit Amperes symmetrical with the specified maximum supply voltage.

Table 3: Drive ratings

Voltage (V)	Ratings kW (HP)	Maximum supply voltage V_{rms} (AC)	Maximum supply short-circuit current A_{rms} (AC)
230	0.37 – 18.5 (0.5 – 25.0)	240	5
	22.0 – 90.0 (30.0 – 120.0)		10
400/460	0.75 – 37.0 (1.0 – 50.0)	500/600	5
	45.0 – 132.0 (60.0 – 175.0)		10
	160.0 (210.0)		18

Output power and current ratings

IP66

Table 4: 200 – 240 V (+ / -10%) 3-phase input, 3-phase output

kW	HP	Frame Size	Nominal Input Current (A)	Fuse/MCB, type B) (A)	Supply cable (mm^2)	Nominal Output Current (A)	110% Output Current 60 seconds (A)	Motor cable	
								mm^2	AWG
4.0	5.0	3	17.3	32	6.0	18.0	19.80	2.5	12

Table 5: 380 – 480 V (+ / -10%) 3-phase input, 3-phase output

kW	HP	Frame Size	Nominal Input Current (A)	Fuse/MCB, type B) (A)	Supply cable (mm^2)	Nominal Output Current (A)	110% Output Current 60 seconds (A)	Motor cable	
								mm^2	AWG
4.0	5.0	2	10.8	16	2.5	9.5	10.45	1.5	12
5.5	7.5	3	13.3	20	2.5	14.0	15.40	2.5	12
7.5	10.0	3	18.5	20	4.0	18.0	19.80	2.5	10

IP55

Table 6: 200 – 240 V (+ / -10%) 3-phase input, 3-phase output

kW	HP	Frame Size	Nominal Input Current (A)	Fuse/MCB, type B) (A)	Supply cable (mm^2)	Nominal Output Current (A)	110% Output Current 60 seconds (A)	Motor cable	
								mm^2	AWG
5.5	7.5	4	25.0	40	6.0	24.0	26.40	4.0	10
7.5	10.0	4	46.6	50	10.0	39.0	42.9	6.0	8.0
15.0	20.0	5	69.6	80	25.0	61.0	67.1	16.0	4.0
22.0	30.0	6	92.3	100	35.0	90.0	99.0	25.0	2.0
37.0	50.0	6	150.2	160	70.0	150.0	165.0	35.0	2/0

Table 7: 380 – 480 V (+ / -10%) 3-phase input, 3-phase output

kW	HP	Frame Size	Nominal Input Current (A)	Fuse/MCB, type B) (A)	Supply cable (mm^2)	Nominal Output Current (A)	110% Output Current 60 seconds (A)	Motor cable	
								mm^2	AWG
15.0	20	4	32.9	50	6.0	30.0	33.00	6.0	6
22.0	30	4	54.1	63	16.0	46.0	50.60	10.0	4
45.0	60	6	92.3	100	35.0	90.0	99.00	25.0	1
75.0	120	6	150.2	160	70.0	150.0	165.00	55.0	3/0

Cable length

The maximum cable length is 100 m (328 ft). Screened cables must be used.

The PWM output switching from any inverter using a long motor cable can cause an increase in the voltage at the motor terminals, depending on the cable length and inductance. The rise time and peak voltage can affect the service life of the motor. Flygt recommend using an output choke for motor cable lengths of 50 m or more to ensure good motor service life.

For UL-compliant installation, use copper wire with a minimum insulation temperature rating of 75°C (167°F). When using fuses type must be Class CC or Class J

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1) The tissue in plants that brings water upward from the roots
2) A leading global water technology company

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xylem
Let's Solve Water

Xylem Water Solutions AB
Gesällvägen 33
174 87 Sundbyberg
Sweden
Tel. +46-8-475 60 00
Fax +46-8-475 69 00
http://tpi.xyleminc.com

Visit our Web site for the latest version of this document and more information

The original instruction is in English. All non-English instructions are translations of the original instruction.

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