

User's Manual

ACS550-PD 3R Irrigation Packaged Drive Supplement to ACS550-U1 User's Manual



ACS550 Drive Manuals

GENERAL MANUALS

ACS550-U1 User's Manual (1...200 HP)

- Safety
- Installation
- Start-Up
- Embedded Fieldbus
- Fieldbus Adapter
- Diagnostics
- Maintenance
- Technical Data

ACS550 Technical Reference Manual (available in electronic format only)

- Detailed Product Description
- Practical Engineering Guides

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Safety



-
-  **WARNING!** The ACS550 adjustable speed AC drive with Input Disconnect should **ONLY** be installed by a qualified electrician.
 -  **WARNING!** Even when the motor is stopped, dangerous voltage is present at the Power Circuit terminals U1, V1, W1 and U2, V2, W2 and, depending on the frame size, UDC+ and UDC-, or BRK+ and BRK-.
 -  **WARNING!** Dangerous voltage is present when input power is connected. After disconnecting the supply, wait at least 5 minutes (to let the intermediate circuit capacitors discharge) before removing the cover.
 -  **WARNING!** Even when power is removed from the input terminals of the ACS550, there may be dangerous voltage (from external sources) on the terminals of the relay outputs.
 -  **WARNING!** When the control terminals of two or more drive units are connected in parallel, the auxiliary voltage for these control connections must be taken from a single source which can either be one of the units or an external supply.
 -  **WARNING!** The ACS550 will start up automatically after an input voltage interruption if the external run command is on.
 -  **WARNING!** When the ACS550 with Input Disconnect is connected to the line power, the Motor Terminals T1, T2, and T3 are live even if the motor is not running. Do not make any connections when the ACS550 with Input Disconnect is connected to the line. Disconnect and lock out power to the drive before servicing the drive. Failure to disconnect power may cause serious injury or death.

Note! For more technical information, contact the factory or your local ABB sales representative.

Use of Warnings and Notes

There are two types of safety instructions throughout this manual:

- Notes draw attention to a particular condition or fact, or give information on a subject.
- Warnings caution you about conditions which can result in serious injury or death and/or damage to the equipment. They also tell you how to avoid the danger. The warning symbols are used as follows:

-  Dangerous voltage warning warns of high voltage which can cause physical injury and/or damage to the equipment.
-  General warning warns about conditions, other than those caused by electricity, which can result in physical injury and/or damage to the equipment.

Installation

Study these installation instructions carefully before proceeding. Failure to observe the warnings and instructions may cause a malfunction or personal hazard.



WARNING! Before you begin read “Safety” on page 1.



WARNING! When the ACS550 with Input Disconnect is connected to the line power, the Motor Terminals T1, T2, and T3 are live even if the motor is not running. Do not make any connections when the ACS550 with Input Disconnect is connected to the line. Disconnect and lock out power to the drive before servicing the drive. Failure to disconnect power may cause serious injury or death.

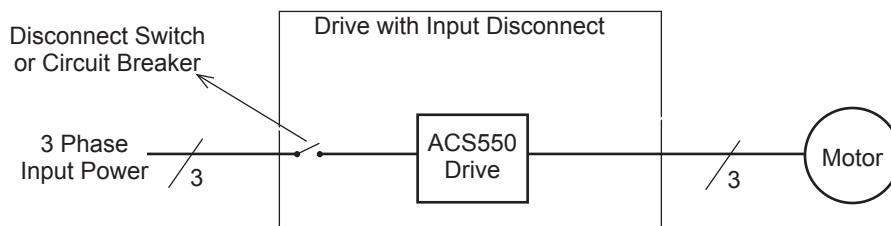
Application

This manual contains supplemental information that is unique to ACS550 input disconnect configurations (PD). Refer to the base manual, AC550-U1 User’s Manual, for all other information.

Input Disconnect Features and Functions

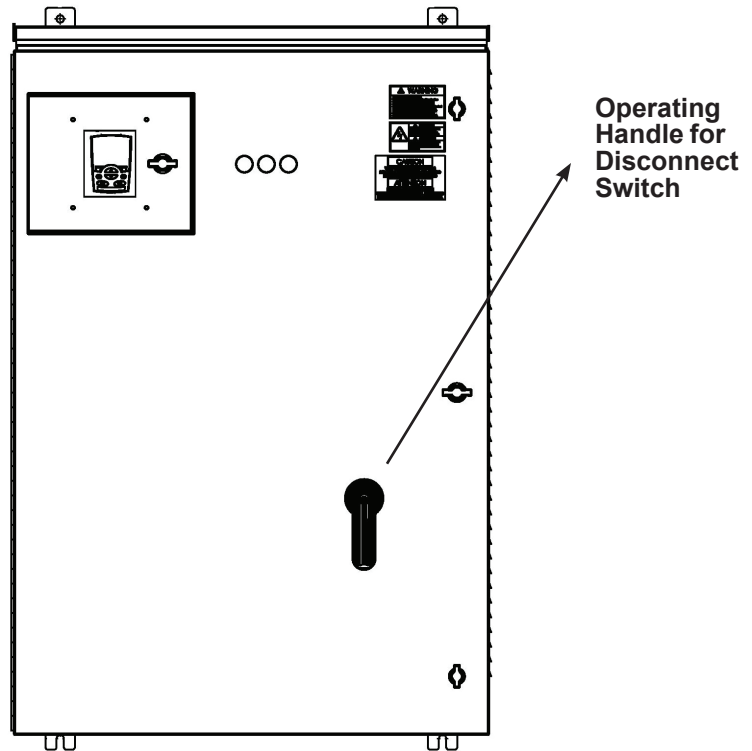
The ACS550 with Input Disconnect is an ACS550 AC adjustable frequency drive packaged with an input disconnect switch and with a door mounted, external operating handle. The operating handle can be padlocked in the OFF position (padlock not supplied). Enclosure are UL Type 3R (NEMA 3R).

The following is a typical power diagram.



The following figures show the front view of the ACS550 Drive with Input Disconnect standard configurations, and identify the major components.

UL Type / NEMA 3R Enclosures



Note! UL Type 3R enclosures are designed to be mounted on a wall. See section “Prepare the UL Type 3R ACS550 for UNISTRUT® mounting” for more details.

Installation Flow Chart

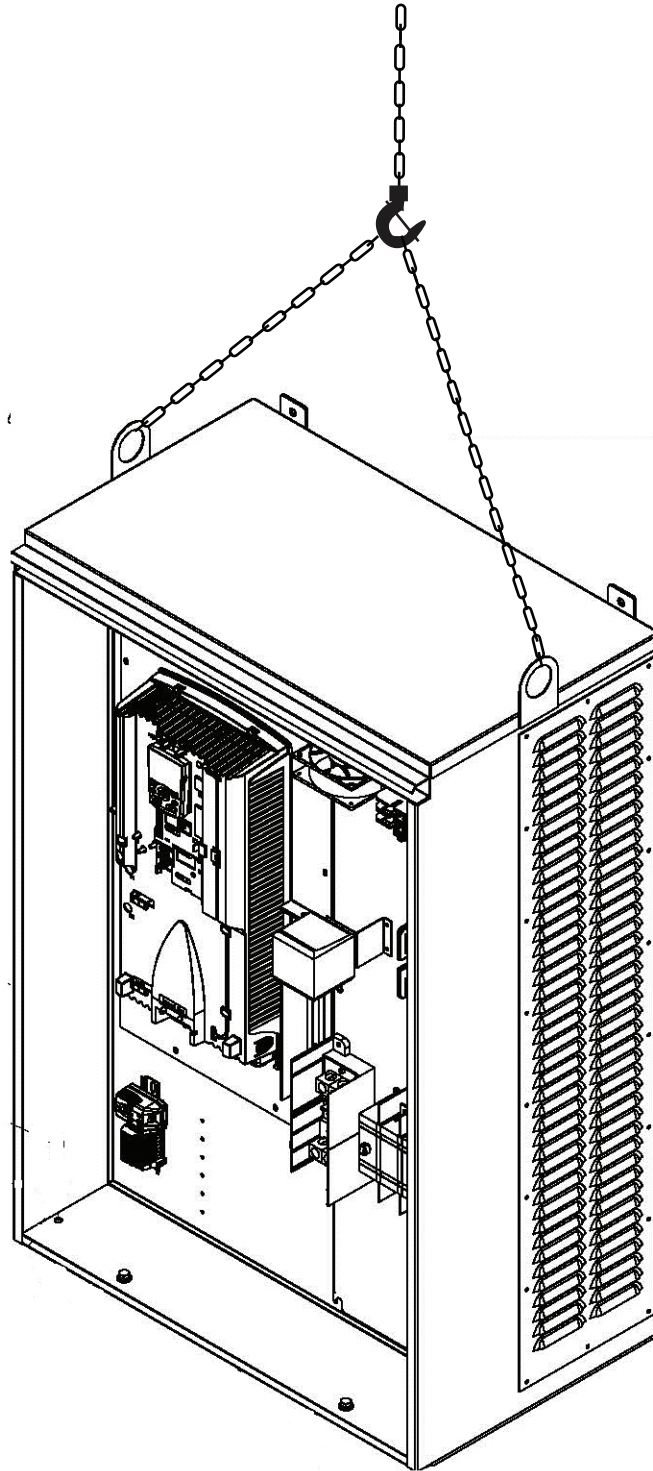
The installation of Input Disconnect configurations for ACS550 drives follows the outline below. The steps must be carried out in the order shown. At the right of each step are references to the detailed information needed for the correct installation of the unit.

Note! References in the middle column below are to the ACS550-U1 User’s Manual. References in the third column below are to this manual.

Task	Refer to the ACS550-U1 User’s Manual “Installation” section	Additional Reference in this Manual
<div style="border: 1px solid black; padding: 5px; text-align: center;"> PREPARE for installation </div>	“Preparing for Installation”	<ul style="list-style-type: none"> • “Drive Identification” on page 9. • “Suitable Mounting Location” on page 10.
<div style="border: 1px solid black; padding: 5px; text-align: center;"> PREPARE the Mounting Location </div>	“Prepare the Mounting Location”	• “Dimensions and Weights”
<div style="border: 1px solid black; padding: 5px; text-align: center;"> MOUNT the drive </div>	“Mount the Drive”	--
<div style="border: 1px solid black; padding: 5px; text-align: center;"> INSTALL wiring </div>	“Wiring Overview” and “Install the Wiring”	“Installing the Wiring”
<div style="border: 1px solid black; padding: 5px; text-align: center;"> CHECK installation </div>	“Check Installation”	--
<div style="border: 1px solid black; padding: 5px; text-align: center;"> APPLY power </div>	“Apply Power”	--
<div style="border: 1px solid black; padding: 5px; text-align: center;"> START-UP </div>	“Start-Up”	--

Preparing for Installation (Supplement to ACS550-U1 User's Manual)

Lifting the Drive



Preparing for Installation (Supplement to ACS550-U1 User’s Manual)

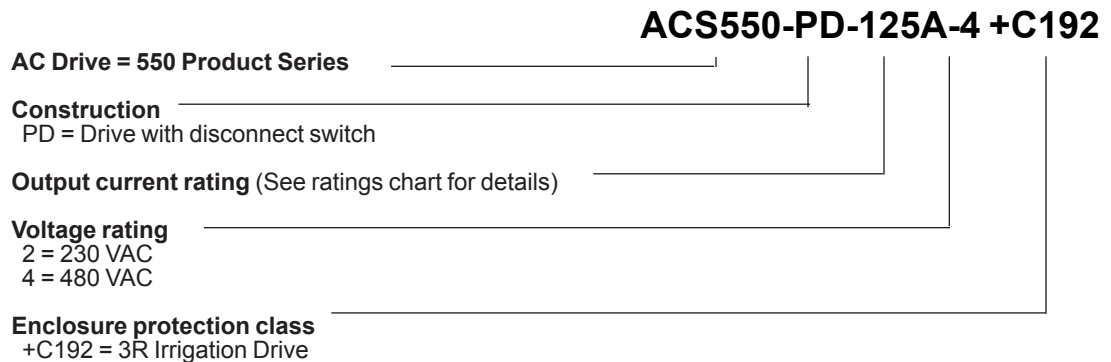
Drive Identification

To identify the type of device you are installing, refer to the type code number on the device identification label.

- Wall mounting base drives – label attached on the side surface of the heat sink.
- Packaged drive – label attached to outside surface on the left side of the enclosure.
- Enclosure with hinged cover/door – label on inside surface of the cover/door.

Type Code Number

Use the following to interpret the type code found on the identification label.



Ratings and Frame Size

Charts in the “Ratings” sections of the ACS550-U1 User’s Manual and this manual list technical specifications, and identify the drive’s frame size.

Note! Some instructions in this document vary, depending on the drive’s frame size. To read the Ratings table, you need the “Output current rating” entry from the type code (see above).

Suitable Mounting Location

For selecting a suitable mounting location for configurations, refer to:

- Preparing for installation in the ACS550-U1 User's Manual, and
- The Technical Data section of this manual for information on dimensions and weights.

Installing the Drive (Supplement to ACS550-U1 User's Manual)



WARNING!

Metal shavings or debris in the enclosure can damage electrical equipment and create a hazardous condition. Where parts, such as conduit plates require cutting or drilling, first remove the part. If that is not practical, cover nearby electrical components to protect them from all shavings or debris.

Do not connect or disconnect input or output power wiring, or control wires, when power is applied.

Never connect line voltage to drive output Terminals T1, T2, and T3.

Do not make any voltage tolerance tests (Hi Pot or Megger) on any part of the unit. Disconnect motor wires before taking any measurements in the motor or motor wires.

Make sure that power factor correction capacitors are not connected between the drive and the motor.

Prepare the Mounting Location

The ACS550 should only be mounted where all of the requirements defined in "Preparing for Installation" are met.

Mount the Drive

1. Use a hoist to move the cabinet into position.

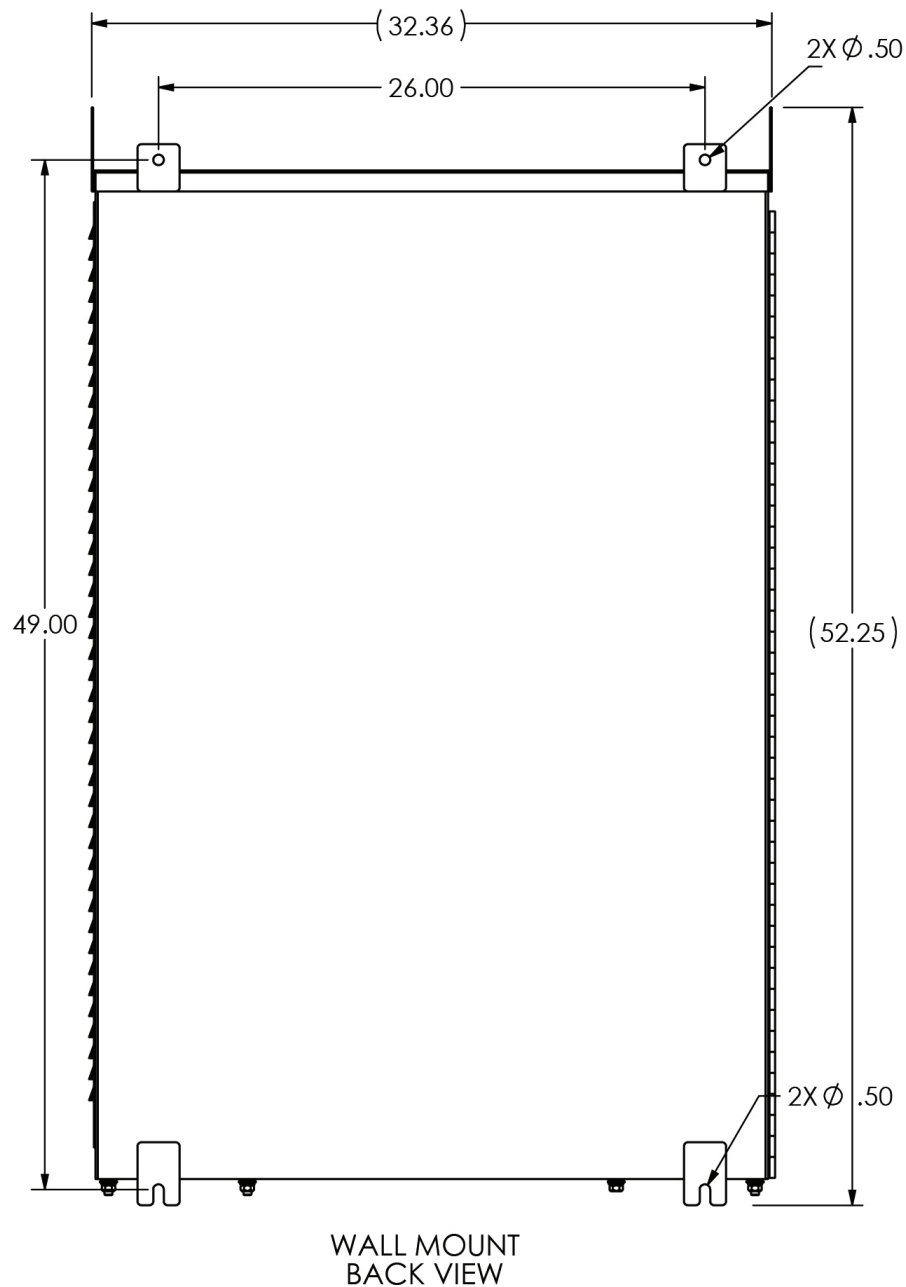
Note! If the cabinet location does not provide access to the cabinet sides, be sure to re-mount side panels before positioning cabinet.

2. Install and tighten mounting bolts.

Installing the Drive - continued

Prepare the UL Type 3R ACS550 for UNISTRUT® mounting or wall mounting

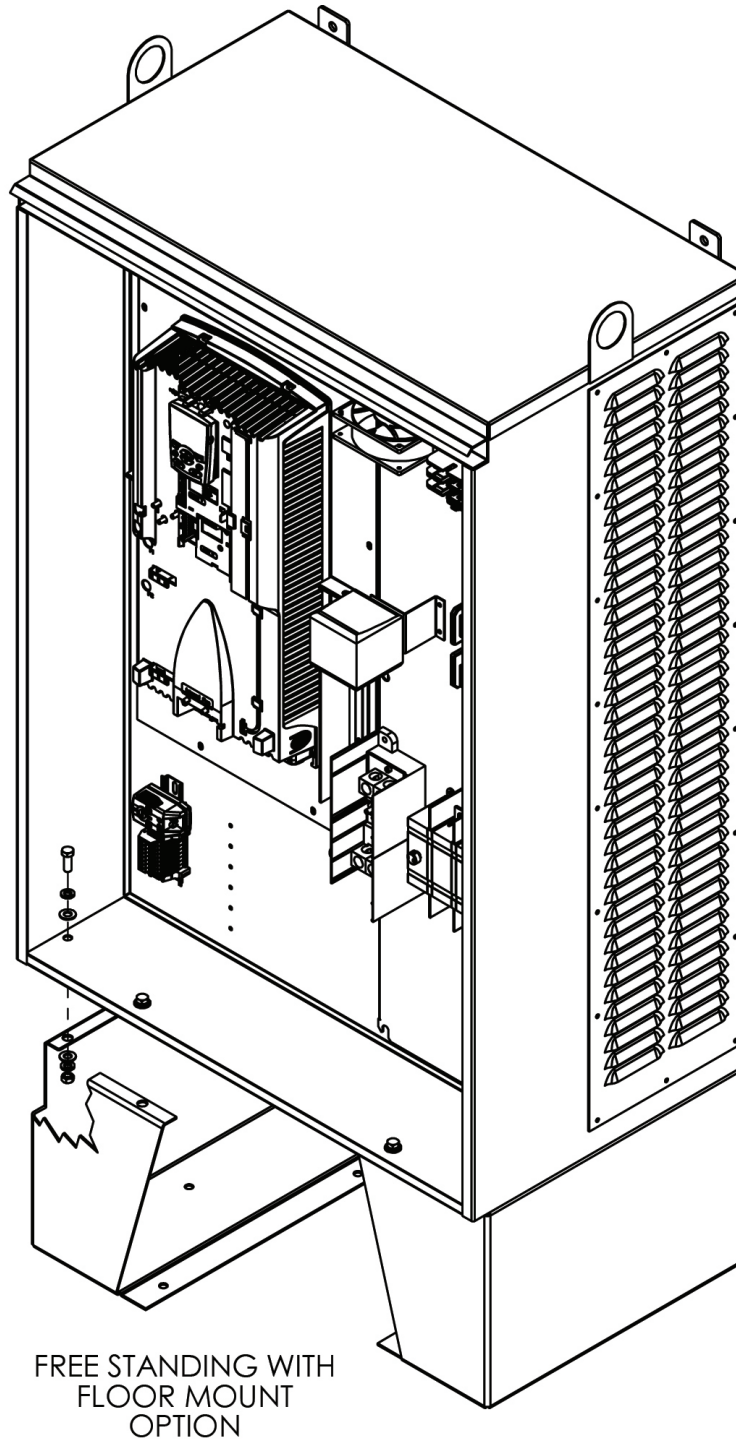
The ACS550 UL Type 3R cabinet frame sizes are designed to be mounted on a solid vertical surface or using UNISTRUT. An optional floor/ground mounting kit is available for purchase.



Installing the Drive - continued

Optional Floor/Ground Mounting Kit

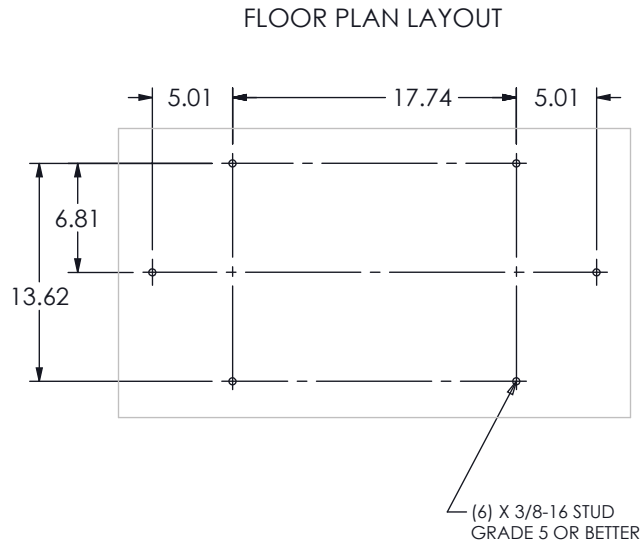
An optional floor/ground mounting kit is available for purchase.



Assembly instructions for mounting optional foot kit on 3R irrigation panel

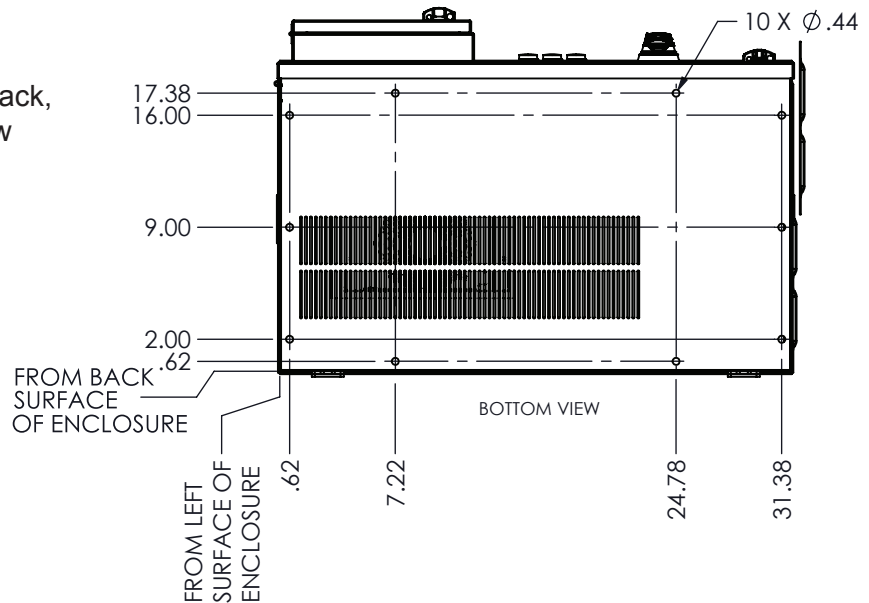
Step 1

Prepare mounting surface for enclosure.



Step 2

With the enclosure laying on it's back, drill the (10) holes as shown below using a 7/16 inch drill bit.

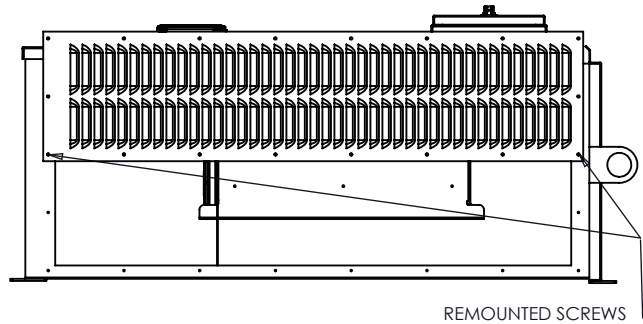


Assembly instructions for mounting optional foot kit on 3R irrigation panel

Step 3

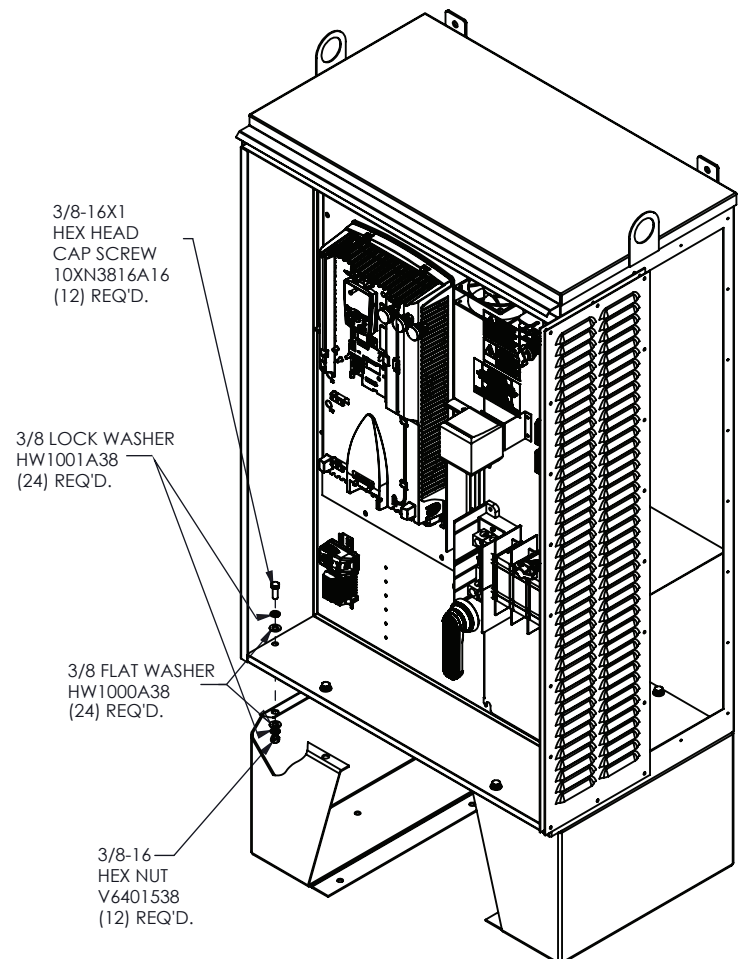
Remove the vent plate on the right side of the enclosure to be able to assemble the hardware for the mounting feet.

The vent plate can be remounted using two screws for safe keeping.



Step 4

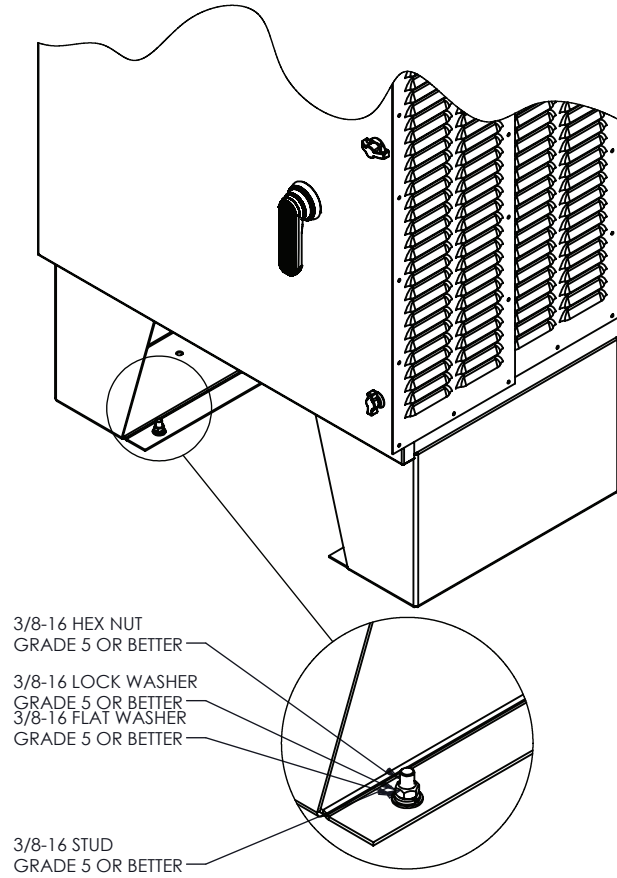
Assemble foot kit with mounting hardware.



Assembly instructions for mounting optional foot kit on 3R irrigation panel

Step 5

Using the lifting eyes, lift the enclosure and place onto mounting studs and assemble hardware.



Installing the Wiring (Supplement to ACS550-U1 User's Manual)

Wiring Requirements

Refer to the "Wiring Requirements" Section in the ACS550-U1 User's Manual. The requirements apply to all ACS550 drives. In particular:

- Use separate, metal conduit runs for the following different classes of wiring:
 - Input power wiring.
 - Motor wiring.
 - Control/communications wiring.
- Properly and individually ground the drive, the motor and cable shields.

Wiring Overview

Power Connection – Standard Drive with Input Disconnect (Wall Mounted)

The following figures show the Standard Drive with Input Disconnect (wall mounted) typical layout. (Refer to the ACS550-U1 User's Manual and 3R Irrigation Control Schematic for control connections to the drive.)

Install the Line Input Wiring

Line Input Connections – Standard Drive with Input Disconnect Configurations

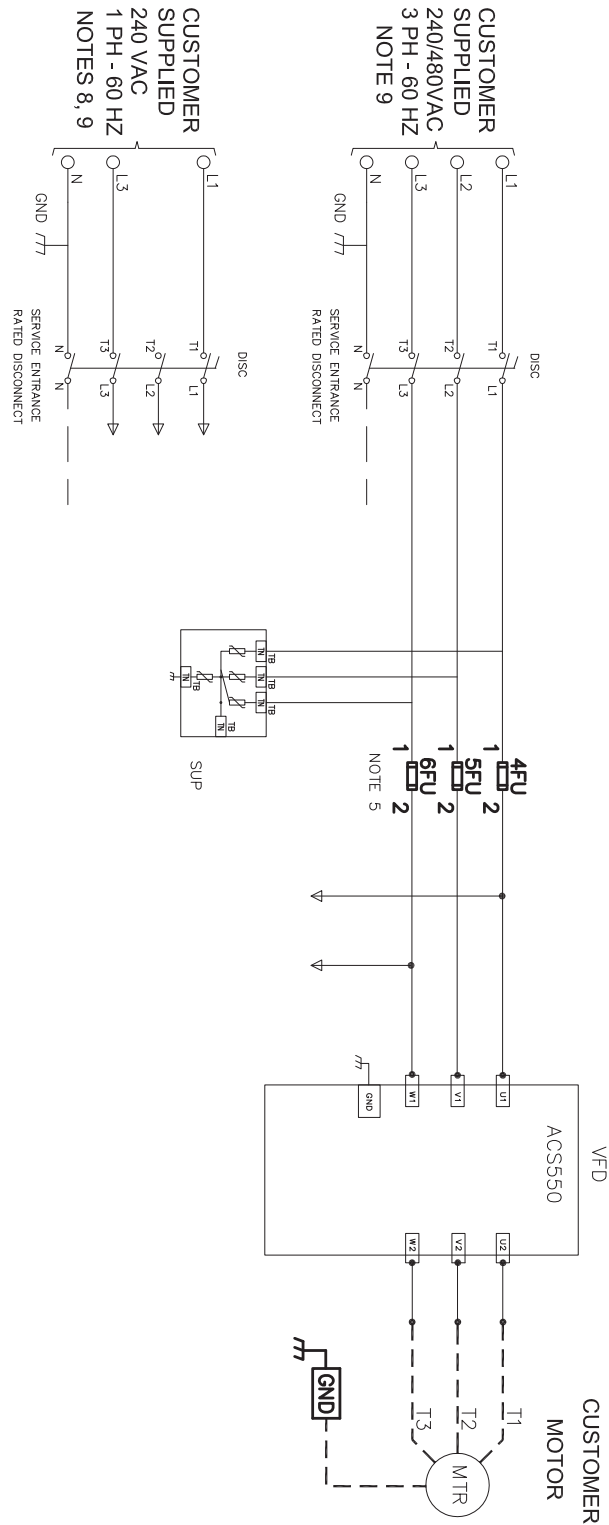
Connect input power to the terminals of the disconnect switch. Connect the equipment grounding conductor to the ground lug. The figure below shows typical connection points for Standard ACS550 Drive with Input Disconnect configurations.



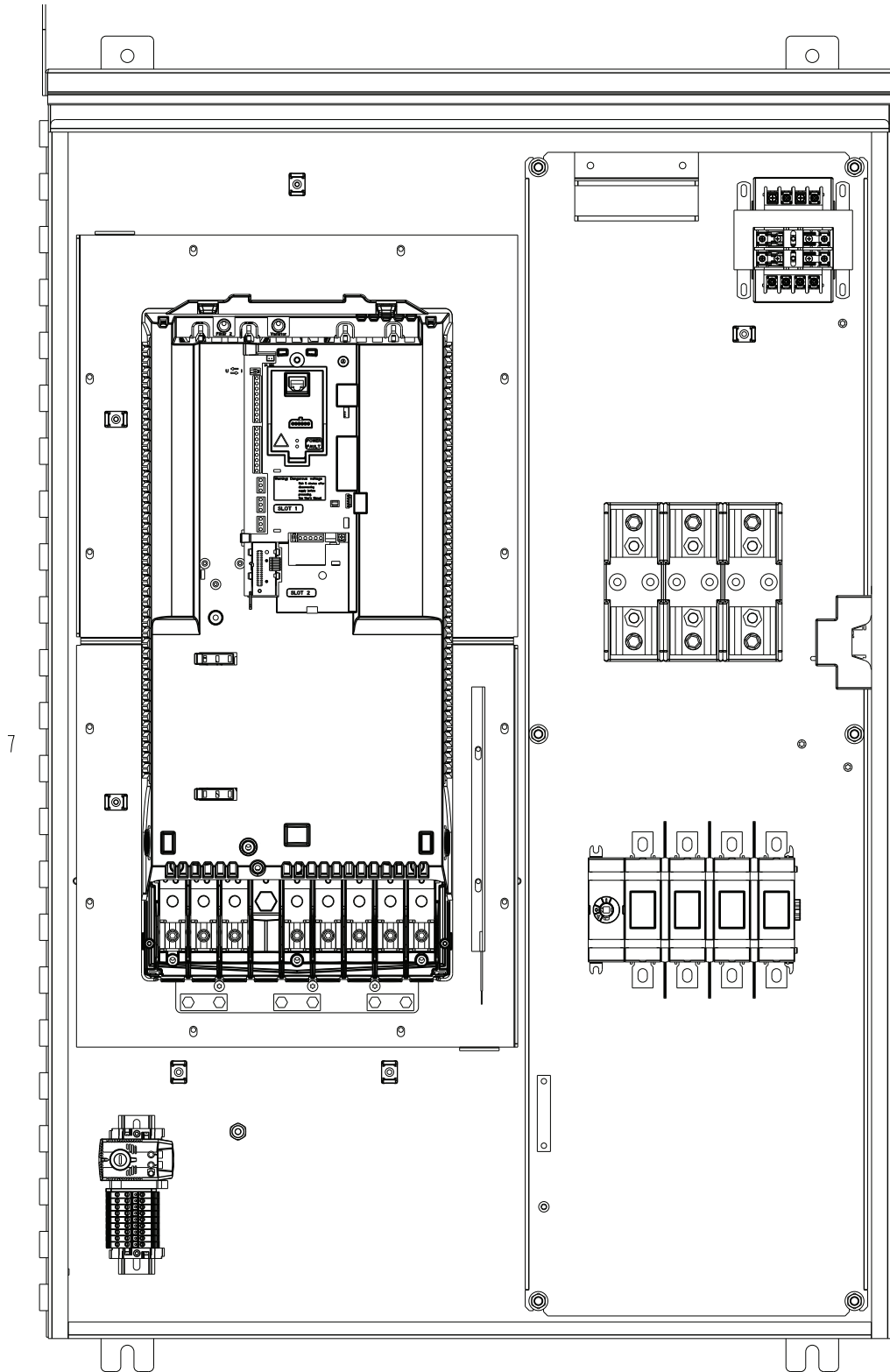
WARNING! Check the motor and motor wiring insulation before connecting the ACS550 to line power. Follow the procedure in the ACS550-U1 User's Manual. Before proceeding with the insulation resistance measurements, check that the ACS550 is disconnected from incoming line power. Failure to disconnect line power could result in death or serious injury.

Note! For the remainder of the installation and start-up (motor and control wiring) refer to the ACS550-U1 User's Manual.

Typical Power Connections for Single and Three Phase

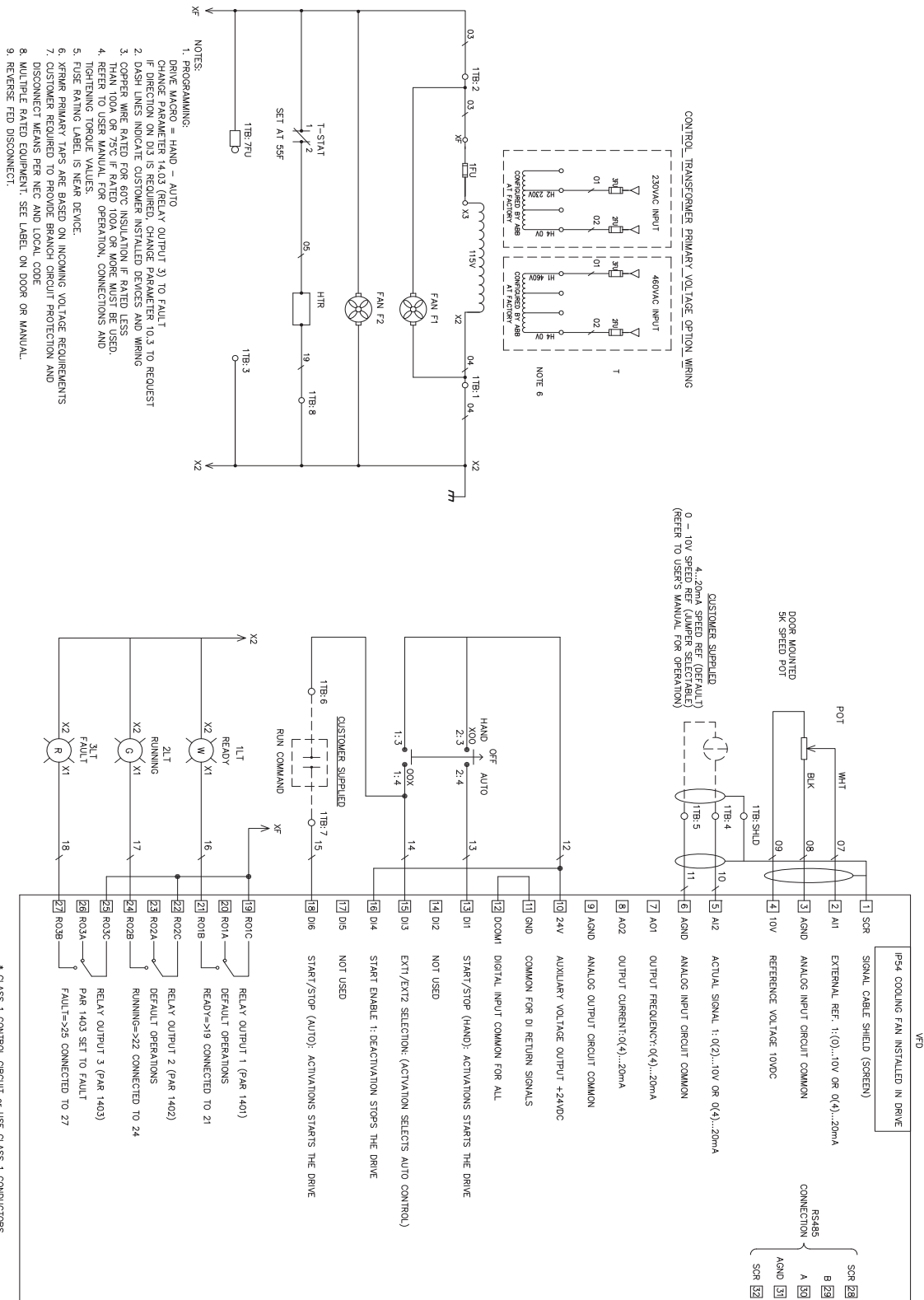


ACS550-PD 15-200 hp



*Typical ACS550 3R irrigation panel layout

Typical Control Schematic

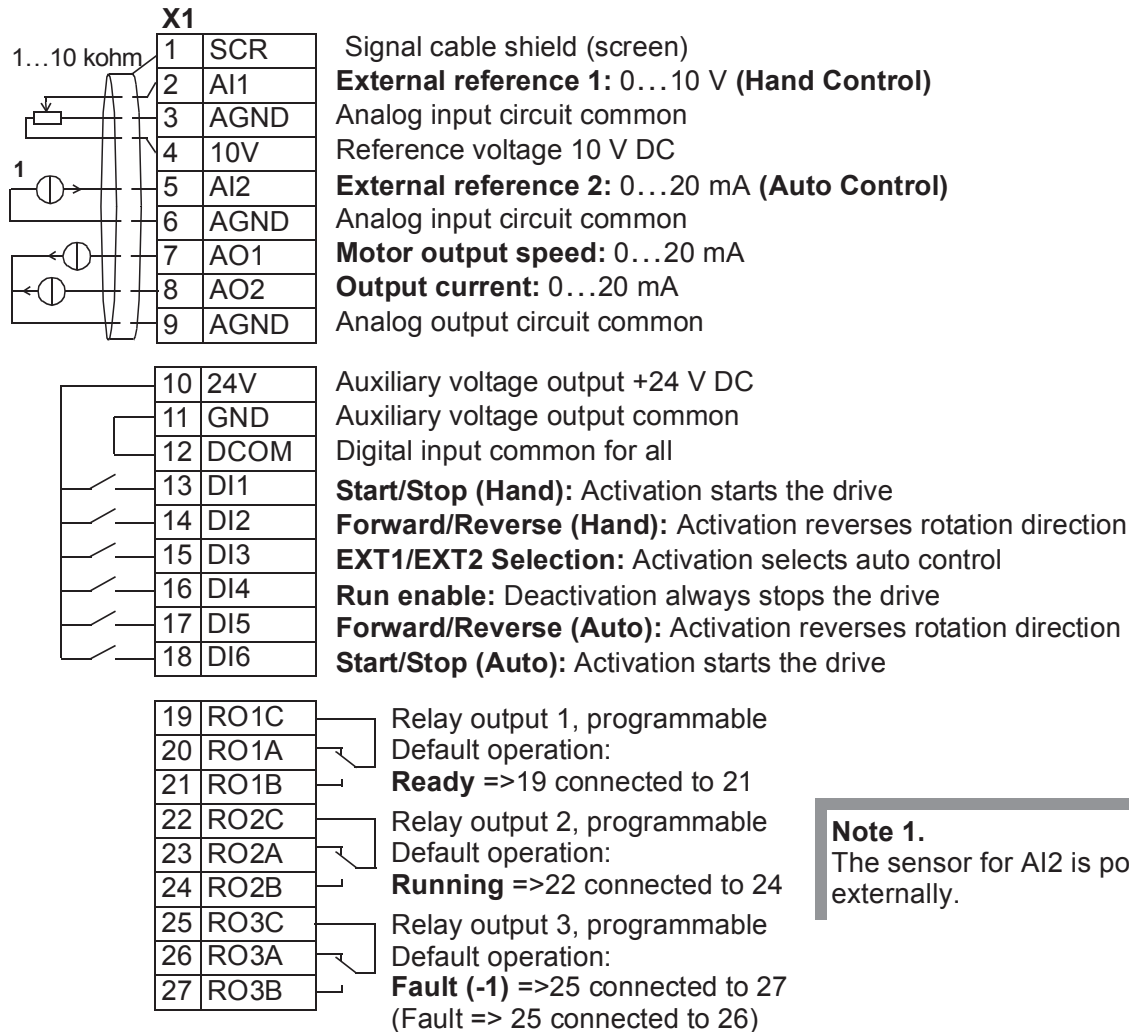


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Application Guides - Hand - Auto Macro

Note: Parameter 2108 START INHIBIT must remain in the default setting, 0 (OFF).

Connection example:



Note 1.
The sensor for AI2 is powered externally.

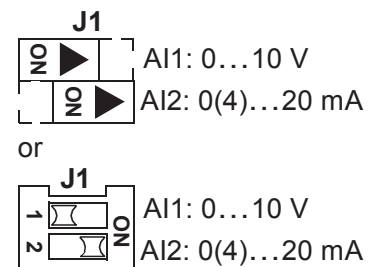
Input signals

- Two analog references (AI1, 2)
- Start/stop – hand/auto (DI1, 6)
- Direction – hand/auto (DI2, 5)
- Control location selection (DI3)
- Run enable (DI4)

Output signals

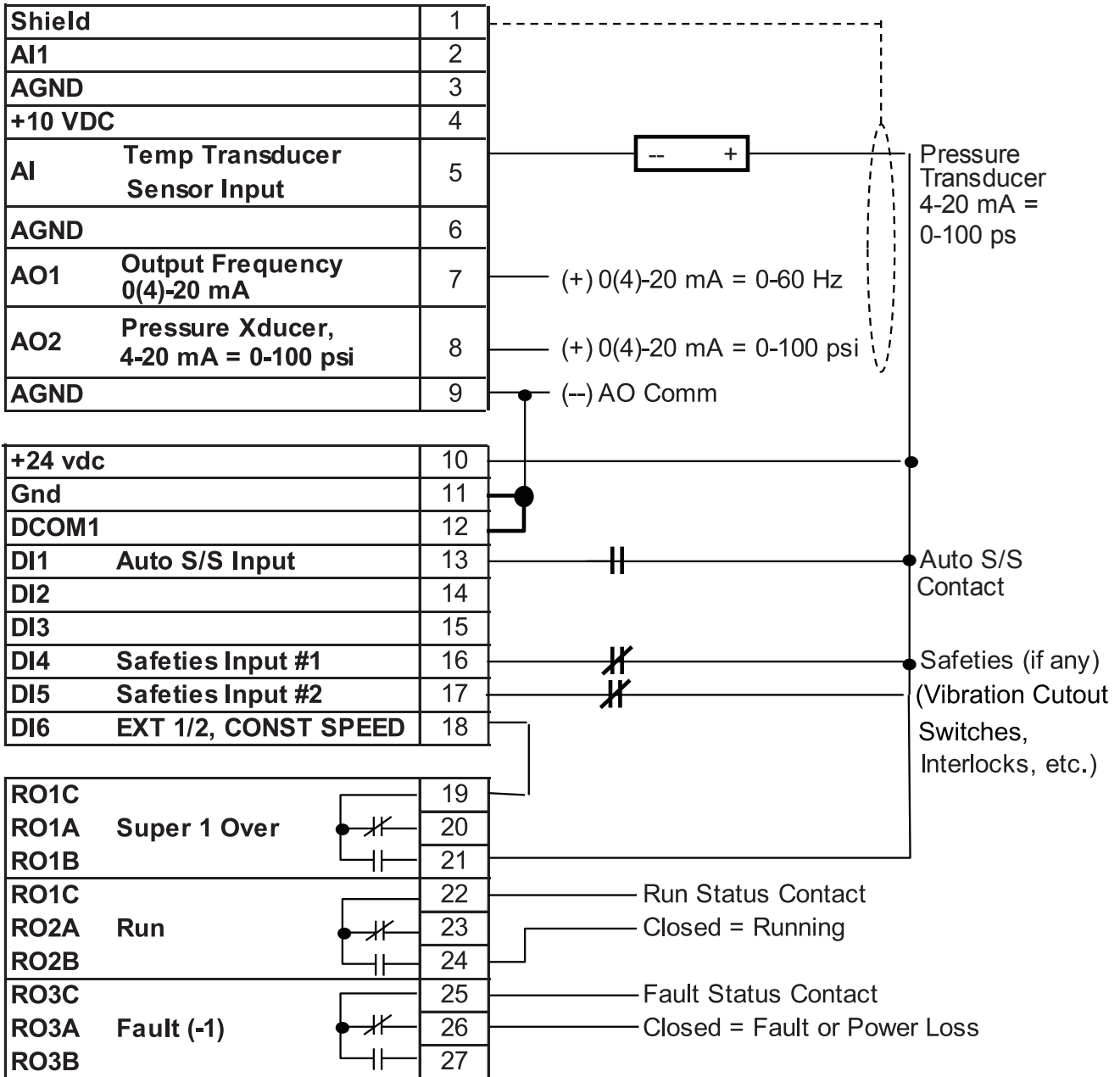
- Analog output AO1: Speed
- Analog output AO2: Current
- Relay output 1: Ready
- Relay output 2: Running
- Relay output 3: Fault (-1)

Jumper setting



Application Guides - Optional Configuration for Soft Pipe Fill

A11 Jumper = I
 A12 Jumper = I



Technical Data

Ratings (Supplement to ACS550-U1 User's Manual)

Note! The ratings listed below are exceptions to the ratings listed in the ACS550-U1 User's Manual.

Input Power Connections and Power Connection Terminals (Supplement to ACS550-U1 User's Manual)

1-Phase 240V

HP	ABB Product Code	Drive Input Fuse Rating		Incoming Power Connections			Ground Lugs UL Type 3R/ NEMA 3R	Output Connections to Motor		
		Amps (600V)	Bussman Type	Minimum Wire Size	Maximum Wire Size	Tightening Torque (lb/ft)		Minimum Wire Size	Maximum Wire Size	Tightening Torque (lb/ft)
15	ACS550-PD-088A-2+C192	100	JJS-110	#8	1/0	55	#2 50 in-lbs	10	1/0	4
20	ACS550-PD-114A-2+C192	150	JJS-150	#4	300MCM	200		10	1/0	4
25	ACS550-PD-143A-2+C192	200	JJS-200	#4	300MCM	200	#2/0 275 in-lbs	3/0	350MCM	30
30	ACS550-PD-178A-2+C192	250	JJS-250	#4	300MCM	200		3/0	350MCM	30
40	ACS550-PD-221A-2+C192	300	JJS-300	#4	300MCM	200	350MCM 100 in-lbs	3/0	350MCM	30
50	ACS550-PD-248A-2+C192	350	JJS-350	#2	600MCM	375		3/0	350MCM	30

NOTE: For information regarding motor terminals, refer to "Drives Power Connection Terminals" in the ACS550-U1 User Manual .

Input Power Connections and Power Connection Terminals (Supplement to ACS550-U1 User's Manual)

3-Phase 240V

HP	ABB Product Code	Drive Input Fuse Rating		Incoming Power Connections			Ground Lugs UL Type 3R/ NEMA 3R	Output Connections to Motor		
		Amps (600V)	Bussman Type	Minimum Wire Size	Maximum Wire Size	Tightening Torque (lb/ft)		Minimum Wire Size	Maximum Wire Size	Tightening Torque (lb/ft)
25	ACS550-PD-075A-2+C192	100	JJS-100	#8	1/0	55	#2 50 in-lbs	10	1/0	4
30	ACS550-PD-088A-2+C192	110	JJS-110	#8	1/0	55		10	1/0	4
40	ACS550-PD-114A-2+C192	150	JJS-150	#4	300MCM	200		10	1/0	4
50	ACS550-PD-143A-2+C192	200	JJS-200	#4	300MCM	200	#2/0 275 in-lbs	3/0	350MCM	30
60	ACS550-PD-178A-2+C192	250	JJS-250	#4	300MCM	200		3/0	350MCM	30
75	ACS550-PD-221A-2+C192	300	JJS-300	#4	300MCM	200	350MCM 100 in-lbs	3/0	350MCM	30
100	ACS550-PD-248A-2+C192	350	JJS-350	#2	600MCM	375		3/0	350MCM	30

NOTE: For information regarding motor terminals, refer to "Drives Power Connection Terminals" in the ACS550-U1 User Manual .

Input Power Connections and Power Connection Terminals (Supplement to ACS550-U1 User's Manual)

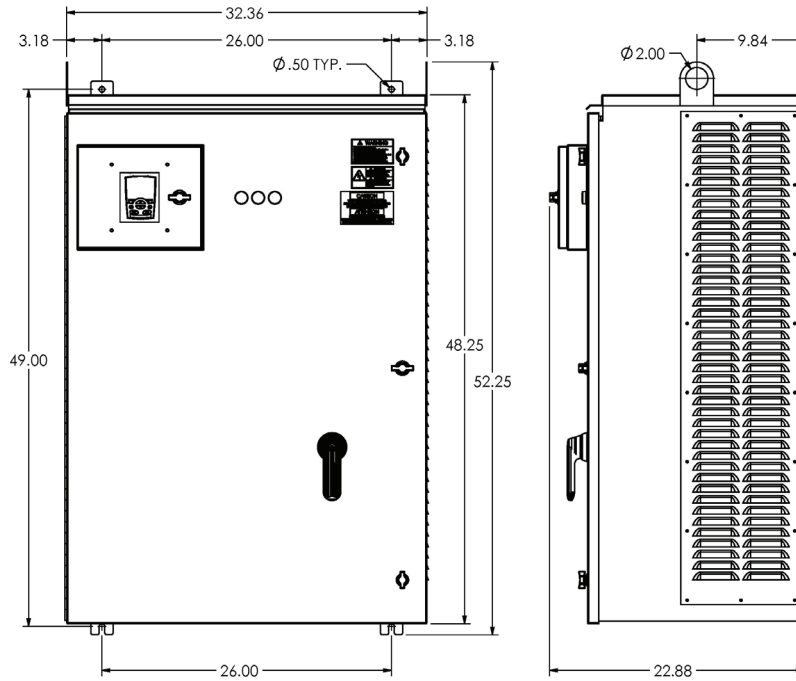
3-Phase 480V

HP	ABB Product Code	Drive Input Fuse Rating		Incoming Power Connections			Ground Lugs UL Type 3R/ NEMA 3R	Output Connections to Motor		
		Amps (600V)	Bussman Type	Minimum Wire Size	Maximum Wire Size	Tightening Torque (lb/ft)		Minimum Wire Size	Maximum Wire Size	Tightening Torque (lb/ft)
40	ACS550-PD-059A-4+C192	80	JJS-80	#8	1/0	55	#2 50 in-lbs	10	1/0	4
50	ACS550-PD-072A-4+C192	90	JJS-90	#8	1/0	55		10	1/0	4
60	ACS550-PD-078A-4+C192	100	JJS-100	#8	1/0	55		10	1/0	4
75	ACS550-PD-097A-4+C192	125	JJS-125	#4	300MCM	200		10	1/0	4
100	ACS550-PD-125A-4+C192	175	JJS-175	#4	300MCM	200		3/0	350MCM	30
125	ACS550-PD-157A-4+C192	200	JJS-200	#4	300MCM	200	#2/0 375 in-lbs	3/0	350MCM	30
150	ACS550-PD-180A-4+C192	250	JJS-250	#2	600MCM	375		3/0	350MCM	30
200	ACS550-PD-246A-4+C192	350	JJS-350	#2	600MCM	375	350MCM 100 in-lbs	3/0	350MCM	30

NOTE: For information regarding motor terminals, refer to "Drives Power Connection Terminals" in the ACS550-U1 User Manual .

Dimensions and Weights (Supplement to ACS550-U1 User's Manual)

Dimensions: ACS550-PD UL Type / NEMA 3R



1-Phase 240V

HP	Weight* (lbs)	Height (in)	Width (in)	Depth (in)
15	310	49.00	32.36	22.88
20	320			
25	330			
30	340			
40	345			
50	350			

3-Phase 240V

HP	Weight* (lbs)	Height (in)	Width (in)	Depth (in)
25	305	49.00	32.36	22.88
30	310			
40	320			
50	330			
60	340			
75	345			
100	350			

3-Phase 480V

HP	Weight* (lbs)	Height (in)	Width (in)	Depth (in)
40	300	49.00	32.36	22.88
50	305			
60	310			
75	320			
100	330			
125	340			
150	345			
200	350			

* Shipping crate adds approximately 170 lbs.


Ambient conditions

The following table lists the ACS550 environmental requirements.

Ambient environment requirements		
	Installation site	Storage and transportation in the protective package
Altitude	<ul style="list-style-type: none"> • 0...1000 m (0...3 300 ft) • 1000...2000 m (3 300...6 600 ft) if P_N and I_{2N} derated 1% every 100 m above 1000 m (300 ft above 3 300 ft) 	
Ambient temperature	<ul style="list-style-type: none"> • Min. -20°C (5 °F) – no frost allowed • Max. (fsw = 1 or 4) 40 °C (104 °F); 50 °C (122 °F) if P_N and I_{2N} derated to 90% • Max. (fsw = 8) 40 °C (104 °F) if P_N and I_{2N} derated to 80% • Max. (fsw = 12) 30 °C (86 °F) if P_N and I_{2N} derated to 65% (to 50% for 600 V, R4 frame sizes, that is for ACS550-U1-032A-6 ... ACS550-U1-062A-6) 	<ul style="list-style-type: none"> • -40...70 °C (-40...158 °F)
Relative humidity	5...95%, no condensation allowed	

Applicable Standards

Drive compliance with the following standards is identified by the standards “marks” on the type code label.

Mark	Applicable Standards	
	UL 508C and C22.2 No. 14	UL Standard for Safety, Power Conversion Equipment, second edition and CSA Standard for Industrial Control Equipment
	UL 508A	UL Standard for Safety, Industrial Control Panels
	C22.2 No. 14	CSA Standard for Industrial Control Equipment

Compliance is valid with the following provisions:

- The motor and control cables are chosen as specified in this manual.
- The installation rules of this manual are followed.

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Maintenance

Maintenance Intervals

If installed in an appropriate environment, the drive requires very little maintenance. This table lists the routine maintenance intervals recommended by ABB.

Maintenance	Configuration	Interval	Instruction
Check/replace UL Type 3R/NEMA 3R enclosure air filters	UL Type / NEMA 3R enclosures	Check every 3 months. Replace as needed.	
Check and clean heatsink.	All	Depends on the dustiness of the environment (every 6...12 months)	See "Maintenance" in ACS550-U1 User's Manual.
Replace drive module fan.	All	Every six years	See "Maintenance" in ACS550-U1 User's Manual.
Replace enclosure fan(s).	NEMA 3R enclosures	Every three years	See "Enclosure Fan Replacement – UL Type / NEMA 3R. See "Maintenance" in ACS550-U1 User's Manual.
Change capacitor.	Frame sizes R5 and R6	Every ten years	See "Maintenance" in ACS550-U1 User's Manual.
Replace battery in the Assistant control panel.	All	Every ten years	See "Maintenance" in ACS550-U1 User's Manual.

Drive Module Fan Replacement

The drive module fan cools the heatsink. Fan failure can be predicted by the increasing noise from fan bearings and the gradual rise in the heatsink temperature in spite of heatsink cleaning. If the drive is operated in a critical part of a process, fan replacement is recommended once these symptoms start appearing. Replacement fans are available from ABB. Do not use other than ABB specified spare parts.

To monitor the running time of the cooling fan, see "Group 29: Maintenance Trig" in the ACS550-U1 Users's Manual.



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