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ALTIVAR 58® *TRX*

Adjustable Speed Drive Controllers

Installation Guide
Type H Controllers

Instruction Bulletin
Retain for future use.



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⚠ DANGER

HAZARDOUS VOLTAGE

- Read and understand this bulletin in its entirety before installing or operating Altivar 58 *TRX* drive controllers.
- This equipment must only be installed, adjusted, repaired, and serviced by qualified personnel.
- The user is responsible for conforming to all applicable code requirements with respect to grounding all equipment.
- Many parts in this drive controller, including printed wiring boards, operate at line voltage. DO NOT TOUCH. Use only electrically insulated tools.
- DO NOT short across DC bus capacitors or touch unshielded components or terminal strip screw connections with voltage present.
- Before servicing the drive controller:
  - — Disconnect all power including external control power that may be present before servicing the drive controller.
  - — Place a “DO NOT TURN ON” label on the drive controller disconnect.
  - — Lock the disconnect in the open position.
  - — WAIT TEN MINUTES for the DC bus capacitors to discharge. Then follow the DC bus voltage measurement procedure on page 42 to verify that the DC voltage is less than 45 V. The drive controller LEDs are not accurate indicators of the absence of DC bus voltage.
- Install and close all covers before applying power or starting and stopping the drive controller.

Electrical shock will result in death or serious injury.

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INTRODUCTION

The Altivar 58 *TRX* (ATV58 *TRX*) series of adjustable frequency AC drive controllers is a Transparent Ready™ product line providing extended functionality and an extended horsepower range for the Altivar 58 AC drive family. The ATV58 *TRX* series includes an analog output, expanded firmware capabilities, and a horsepower range up to 500 hp. As a Transparent Ready product equipped with an Ethernet connection, ATV58 *TRX* drive controllers can be configured, controlled, monitored, and diagnosed over an Ethernet network with a standard Web browser. No special software or drivers are needed.

Product Range

The ATV58 *TRX* drive controllers range from:

- 1 to 75 hp (0.75 to 55 kW) constant torque, 400/460 V, three-phase input
- 100 to 350 hp (75 to 220 kW) constant torque, 460 V, three-phase input
- 1 to 500 hp (0.75 to 315 kW) variable torque, 400/460 V, three-phase input
- 0.5 to 7.5 hp (0.37 to 5.5 kW) constant torque, 208/230 V, single-phase input
- 0.5 to 30 hp (0.37 to 22 kW) variable torque, 208/230 V, single-phase input
- 2 to 40 hp (1.5 to 30 kW) constant torque (50 hp variable torque), 208/230 V, three-phase input

Product Features

ATV58 *TRX* drive controllers ATV58HD28N4 to ATV58HD79N4 and ATV58HD16M2 to ATV58HD46M2 have built-in line reactors.

Most ATV58 *TRX* drive controllers are available with a built-in EMC filter. Separately mounted EMC filters are available for the full product range. The EMC filter reduces conducted and radiated emissions. It complies with product standards IEC 61800-3 and EN 61800-3 for drive controllers, meeting the requirements of the European directive on EMC.

The 5–75 hp 460 Vac variable torque drive controllers are available without the integrated EMC filter for 460 Vac installations where the

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filter is not required. This allows the controller to be rated for additional horsepower at 460 Vac as shown in Table 10 on page 17. An “X” in the catalog number indicates that the drive controller does not have the EMC filter and can be adjusted to the next higher horsepower rating (based on NEC motor current tables).

The ATV58 *TRX* controllers accept all of the I/O options, communication card options, and hardware options, such as ventilation fan kits and conduit box kits. See the Appendix on page 87 for a complete list of options.

Related Documentation

This instruction bulletin covers the technical characteristics, specifications, installation, and wiring of all ATV58 *TRX* Type H drive controllers.

For information on programming and troubleshooting the drive controller, refer to the keypad display instruction bulletin, VVDED397047US.

Hazard Categories and Special Symbols

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of the lightning bolt or ANSI man symbol (see page 7) to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

The exclamation point symbol (see page 7) is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

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Symbol	Name
	Lightning Bolt
	ANSI Man
	Exclamation Point

⚠ DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, can result in death or serious injury.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, can result in minor or moderate injury.

CAUTION

CAUTION, used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, can result in property damage.

Product Support

For support and assistance, contact the Product Support Group. The Product Support Group is staffed from 8:00 am until 6:00 pm Eastern time to assist with product selection, start-up, and diagnosis of product or application problems. Emergency phone support is available 24 hours a day, 365 days a year.

Toll free: 888-SquareD (888-778-2733)
E-Mail: drive.products.support@us.schneider-electric.com
Fax: 919-217-6508

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RECEIVING AND PRELIMINARY INSPECTION

⚠ DANGER

DAMAGED EQUIPMENT

Do not operate or install any drive controller that appears damaged.

Failure to follow this instruction will result in death, serious injury, or equipment damage.

Before installing the drive controller, read this manual and follow all precautions.

Before removing the drive controller from its packaging, verify that the carton is not damaged from shipping. Damage to the carton usually indicates improper handling. If any damage is found, notify the carrier and your Schneider Electric representative.

After removing the drive controller from its packaging, inspect it for damage. If any damage is found, notify the carrier and your sales representative. Verify that the drive controller nameplate and label conform to the packing slip and corresponding purchase order.

Storing and Shipping

If the drive controller is not being immediately installed, store it in a clean, dry area where the ambient temperature is between -13 and +149 °F (-25 and +65 °C). If the drive controller must be shipped to another location, use the original shipping material and carton to protect the drive controller.

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RATINGS

Tables 1 through 10 (pages 10 through 17) contain the ratings of the ATV58 *TRX* Type H drive controllers.

A drive controller usually has more than one rating. The rating depends on the application, incoming line power, and how the product is configured. On 5–75 hp 460 Vac devices, the rating changes depending on whether the product has an internally mounted EMC filter.

The table heading “Variable Torque Low Noise” conveys information about the switching frequency setting. A higher switching frequency setting reduces audible motor noise. For more information on this and other drive control applications, go to www.us.SquareD.com and search for “AC Drive Application Guide.”

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Table 1: Constant Torque, 208/230 V Ratings, Switching Frequency @4 kHz, w/ Integrated EMC Filter

Single-phase input

Frame Size	Drive Controller Catalog Number	Motor Power 208/230 V		Rated Output Current	Transient Output Current	Total Dissipated Power @ Rated Load
		kW	hp	A	A	W
1	ATV58HU09M2ZU	0.37	0.5	2.3	3.1	42
	ATV58HU18M2ZU	0.75	1	4.1	5.6	64
2	ATV58HU29M2ZU	1.5	2	7.8	10.6	107
	ATV58HU41M2ZU	2.2	3	11	15.0	156
3	ATV58HU72M2ZU [1]	3	4	13.7	18.6	160
4	ATV58HU90M2ZU [1]	4	5	18.2	24.8	176
	ATV58HD12M2ZU [1]	5.5	7.5	24.2	32.9	204

[1] When these drive controllers are used with a single-phase input, a line reactor (3% minimum) must be used.

Table 2: Variable Torque Low Noise, 208/230 V Ratings, Switching Frequency: ATV58HU09M2–D12M2 @ 8 kHz, ATV58HD16M2–D46M2 @ 4kHz

Single-phase input

Frame Size	Drive Controller Catalog Number	Motor Power 208/230 V		Rated Output Current	Transient Output Current	Total Dissipated Power @ Rated Load
		kW	hp	A	A	W
1	ATV58HU09M2ZU	0.37	0.5	2.5	2.8	42
	ATV58HU18M2ZU	0.75	1	4.8	5.3	64
2	ATV58HU29M2ZU	1.5	2	7.8	8.6	107
	ATV58HU41M2ZU	2.2	3	11	12.1	156
3	ATV58HU72M2ZU[1]	3	4	14.3	15.7	160
4	ATV58HU90M2ZU[1]	4	5	17.5	19.3	176
	ATV58HD12M2ZU[1]	5.5	7.5	25.3	27.8	204
6	ATV58HD16M2XZU[1]	7.5	10	30.8	33.9	323
	ATV58HD23M2XZU[1]	11	15	46.2	50.8	550
7	ATV58HD28M2XZU[1]	15	20	60	66.0	745
	ATV58HD33M2XZU[1]	18.5	25	75	82.5	895
	ATV58HD46M2XZU[1]	22	30	88	96.8	900

[1] When these drive controllers are used with a single-phase input, a line reactor (3% minimum) must be used.

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Table 3: Constant Torque, 208/230 V Ratings, Switching Frequency: ATV58HU29M2–D23M2 @ 4kHz, ATV58HD28M2–D46M2 @ 2 kHz

Three-phase input

Frame Size	Drive Controller Catalog Number[1]	Motor Power 208/230 V		Rated Output Current	Transient Output Current	Total Dissipated Power @ Rated Load
		kW	hp	A	A	W
2	ATV58HU29M2•	1.5	2	7.8	10.6	107
	ATV58HU41M2•	2.2	3	11	15.0	160
3	ATV58HU54M2•	3	4	13.7	18.6	190
	ATV58HU72M2•	4	5	18.2	24.8	240
4	ATV58HU90M2	5.5	7.5	24.2	32.9	255
	ATV58HD12M2•	7.5	10	31	42.2	350
6	ATV58HD16M2•	11	15	47	63.9	745
	ATV58HD23M2•	15	20	60	81.6	895
7	ATV58HD28M2•	18.5	25	75	102.0	900
	ATV58HD33M2•	22	30	88	119.7	1030
	ATV58HD46M2•	30	40	116	157.8	1315

[1] The symbol "•" in a catalog number indicates part of the number that varies with the rating. Refer to catalog 8806CT9901 to complete the catalog number.

Table 4: Constant Torque Low Noise, 208/230 V Ratings, Switching Frequency: ATV58HD16M2–D23M2 @ 8 kHz, ATV58HD28M2–D46M2 @ 4 kHz

Three-phase input

Frame Size	Drive Controller Catalog Number[1]	Motor Power 208/230 V		Rated Output Current	Transient Output Current	Total Dissipated Power @ Rated Load
		kW	hp	A	A	W
6	ATV58HD16M2•	7.5	10	31	42.2	745
	ATV58HD23M2•	11	15	47	63.9	895
7	ATV58HD28M2•	15	20	60	81.6	900
	ATV58HD33M2•	18.5	25	75	102.0	1030
	ATV58HD46M2•	22	30	88	119.7	1315

[1] The symbol "•" in a catalog number indicates part of the number that varies with the rating. Refer to catalog 8806CT9901 to complete the catalog number.

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Table 5: Variable Torque, 208/230 V Ratings, Switching Frequency: ATV58HU29M2–D23M2 @ 4 kHz, ATV58HD28M2–D46M2 @ 2 kHz

Three-phase input

Frame Size	Drive Controller Catalog Number[1]	Motor Power 208/230 V		Rated Output Current	Transient Output Current	Total Dissipated Power @ Rated Load
		kW	hp	A	A	W
2	ATV58HU29M2•	1.5	2	7.8	8.6	107
	ATV58HU41M2•	2.2	3	11	12.1	158
3	ATV58HU54M2•	3	4	14.3	15.7	190
	ATV58HU72M2•	4	5	16.7	18.4	198
4	ATV58HU90M2	5.5	7.5	24.2	26.6	235
	ATV58HD12M2•	7.5	10	30.8	33.9	323
6	ATV58HD16M2•	11	15	46.2	50.8	550
	ATV58HD16M2•	15	20	60	66.0	745
	ATV58HD23M2•	18.5	25	75	82.5	895
7	ATV58HD28M2•	22	30	88	96.8	900
	ATV58HD33M2•	30	40	116	127.6	1030
	ATV58HD46M2•	37	50	143	157.3	1315

[1] The symbol "•" in a catalog number indicates part of the number that varies with the rating. Refer to catalog 8806CT9901 to complete the catalog number.

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Table 6: Variable Torque Low Noise, 208/230 V Ratings, Switching Frequency: ATV58HU29M2–D23M2 @ 8 kHz, ATV58HD28M2–D46M2 @ 4 kHz

Three-phase input

Frame Size	Drive Controller Catalog Number[1]	Motor Power 208/230 V		Rated Output Current	Transient Output Current	Total Dissipated Power @ Rated Load
		kW	hp	A	A	W
2	ATV58HU29M2•	1.5	2	7.5	8.3	107
	ATV58HU41M2•	2.2	3	10.6	11.7	158
3	ATV58HU54M2•	3	4	14.3	15.7	190
	ATV58HU72M2•	4	5	16.7	18.4	198
4	ATV58HU90M2	5.5	7.5	24.2	26.6	235
	ATV58HD12M2•	7.5	10	30.8	33.9	323
6	ATV58HD16M2•	11	15	46.2	50.8	745
	ATV58HD23M2•	15	20	60	66.0	890
7	ATV58HD28M2•	18.5	25	75	82.5	980
	ATV58HD33M2•	22	30	88	96.8	975
	ATV58HD46M2•	30	40	116	127.6	1215

[1] The symbol "•" in a catalog number indicates part of the number that varies with the rating. Refer to catalog 8806CT9901 to complete the catalog number.

Table 7: Constant Torque, 400 /460 V Ratings, Switching Frequency: ATV58HU18N4–D46N4 @ 4 kHz, ATV58HD54N4–C33N4X @ 2 kHz

Three-phase input

Frame Size	Drive Controller Catalog Number[1]	Motor Power		Rated Output Current	Transient Output Current	Total Dissipated Power @ Rated Load
		400 V kW	460 V hp	A	A	W
2	ATV58HU18N4•	0.75	1	2.3	3.1	57
	ATV58HU29N4•	1.5	2	4.1	5.6	97
	ATV58HU41N4•	2.2	3	5.8	7.9	120
3	ATV58HU54N4•	3	4	7.8	10.6	170
	ATV58HU72N4•	4	5	10.5	14.3	210
	ATV58HU90N4	5.5	7.5	13	17.7	295
4	ATV58HD12N4•	7.5	10	17.6	23.9	360
	ATV58HD16N4•	11	15	24.2	32.9	480

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Table 7: Constant Torque, 400 /460 V Ratings, Switching Frequency: ATV58HU18N4–D46N4 @ 4 kHz, ATV58HD54N4–C33N4X @ 2 kHz *(cont.)*

Frame Size	Drive Controller Catalog Number[1]	Motor Power		Rated Output Current	Transient Output Current	Total Dissipated Power @ Rated Load
		400 V kW	460 V hp	A	A	W
5	ATV58HD23N4•	15	20	33	44.9	590
6	ATV58HD28N4•	18.5	25	40.7	55.4	421
	ATV58HD33N4•	22	30	48.4	65.8	491
	ATV58HD46N4•	30	40	66	89.8	625
7	ATV58HD54N4•	37	50	79.2	107.7	677
	ATV58HD64N4•	45	60	93.5	127.2	837
	ATV58HD79N4•	55	75	115.5	157.1	1090
8	ATV58HC13N4X	75	100	132	198	1650
9	ATV58HC15N4X	90	125	176	264	2250
	ATV58HC19N4X	110	150	221	332	2750
	ATV58HC23N4X	132	200	264	397	3300
10	ATV58HC25N4X	160	250	303	455	4000
	ATV58HC31N4X	200	300	378	567	5000
	ATV58HC33N4X	220	350	432	649	5500

[1] The symbol "•" in a catalog number indicates part of the number that varies with the rating. Refer to catalog 8806CT9901 to complete the catalog number.

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Table 8: Constant Torque Low Noise, 400/460 V Ratings, Switching Frequency: ATV58HD28N4–D46N4 @ 8 kHz, ATV58HD54N4–D79N4 @ 4 kHz

Three-phase input

Frame Size	Drive Controller Catalog Number[1]	Motor Power		Rated Output Current	Transient Output Current	Total Dissipated Power @ Rated Load
		400 V kW	460 V hp	A	A	W
6	ATV58HD28N4•	15	20	33	44.9	429
	ATV58HD33N4•	18.5	25	40.7	55.4	524
	ATV58HD46N4•	22	30	48.4	65.8	561
7	ATV58HD54N4•	30	40	66	89.8	627
	ATV58HD64N4•	37	50	79.2	107.7	677
	ATV58HD79N4•	45	60	93.5	127.2	1007

[1] The symbol "•" in a catalog number indicates part of the number that varies with the rating. Refer to catalog 8806CT9901 to complete the catalog number.

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Table 9: Variable Torque, 400/460 V Ratings, Switching Frequency: ATV58HU18N4–D23N4 @ 8 kHz, ATV58HD28N4–D46N4 @ 4 kHz, ATV58HD54N4–C33N4X @ 2 kHz

Three-phase input

Frame Size	Drive Controller Catalog Number[1]	Motor Power		Rated Output Current	Transient Output Current	Total Dissipated Power @ Rated Load
		400 V kW	460 V hp	A	A	W
2	ATV58HU18N4•	0.75	1	2.3	3.1	57
	ATV58HU29N4•	1.5	2	4.1	5.6	97
	ATV58HU41N4•	2.2	3	5.8	7.9	119
3	ATV58HU54N4•	3	4	7.8	10.6	170
	ATV58HU72N4•	4	5	10.5	14.3	209
	ATV58HU90N4	5.5	7.5	13	17.7	291
4	ATV58HD12N4•	7.5	10	17.6	23.9	352
	ATV58HD16N4•	11	15	24.2	32.9	472
5	ATV58HD23N4•	15	20	33	44.9	584
6	ATV58HD28N4•[2]	18.5	25	40.7	55.4	474
	ATV58HD28N4•	22	30	44	55.4	618
	ATV58HD33N4•	30	40	60	65.8	713
	ATV58HD46N4•	37	50	72	89.8	770
7	ATV58HD54N4•	45	60	85	107.7	987
	ATV58HD64N4•	55	75	105	127.2	1075
	ATV58HD79N4	75	100	138	157.1	1439
8	ATV58HC10N4X•[3]	90	125	156	172	2250
9	ATV58HC13N4X•[3]	110	150	180	198	2750
	ATV58HC15N4X•[3]	132	200	240	264	3300
	ATV58HC19N4X•[3]	160	250	302	332	4000
10	ATV58HC23N4X•[3]	200	300	361	397	5000
	ATV58HC25N4X•[3]	220	350	414	455	5500
	ATV58HC28N4X•[3]	250	400	477	525	6250
	ATV58HC31N4X•[3]	280	450	515	567	7000
	ATV58HC33N4X•[3]	315	500	590	649	7875

1 The symbol "•" in a catalog number indicates part of the number that varies with the rating. Refer to catalog 8806CT9901 to complete the catalog number.

2 The ATV58HD28N4 drive controller is rated for 8 kHz operation at 18.5 kW/25 hp.

3 An "X" in the catalog number indicates that internal EMC filters are not available for these products.

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Table 10: Variable Torque Low Noise, 400/460 V Ratings, Switching Frequency: ATV58HU18N4–D46N4 @ 8 kHz, ATV58HD54N4–D79N4 @ 4 kHz

Three-phase input

Frame Size	Drive Controller Catalog Number[1]	Motor Power		Rated Output Current	Transient Output Current	Total Dissipated Power @ Rated Load
		400 V kW	460 V hp	A	A	W
2	ATV58HU18N4•	0.75	1	2.1	2.3	57
	ATV58HU29N4•	1.5	2	3.4	3.7	97
	ATV58HU41N4•	2.2	3	4.8	5.3	119
3	ATV58HU54N4X•	[2]	5	7.6	8.4	209
	ATV58HU72N4X•	[2]	7.5	11	12.1	291
	ATV58HU90N4X•	[2]	10	14	15.4	352
4	ATV58HD12N4X•	[2]	15	21	23.1	472
	ATV58HD16N4X•	[2]	20	27	29.7	584
5	ATV58HD23N4X•	[2]	25	34	37.4	654
6	ATV58HD28N4•	18.5	25	34	37.4	502
	ATV58HD33N4•	22	30	40	44.0	584
	ATV58HD46N4•	30	40	52	57.2	714
7	ATV58HD54N4•	37	50	65	71.5	732
	ATV58HD64N4•	45	60	77	84.7	904
	ATV58HD79N4•	55	75	96	105.6	1183

[1] The symbol "•" in a catalog number indicates part of the number that varies with the rating. Refer to catalog 8806CT9901 to complete the catalog number.

[2] An "X" in the catalog number indicates that the drive controller does not have an EMC filter. This product is for 460 Vac applications. See Table 9 for 400 Vac rated products in this hp range. Refer to page 5 for more application and rating information.

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SPECIFICATIONS

Table 11: Environmental Specifications

NOTE: Exposure to direct sunlight will discolor drive controller plastic pieces.

Enclosure type	ATV58HU09M2 to U90N4: IP20/open type controllers according to Standard EN50178. ATV58HU90M2 to D46M2, ATV58HD12N4 to D79N4: UL Type 1 with conduit connection kit. ATV58HC10N4X to C33N4X: IP20 on all surfaces with the conduit entry kit installed. IP00 on the bottom without the conduit entry kit.
Resistance to vibrations	According to IEC 60068-2-6: 1.5 mm zero to peak from 3 to 13 Hz 1 gn from 13 to 200 Hz ATV58HC10N4X–C33N4X: 0.6 gn from 10 to 55 Hz
Resistance to shocks	According to IEC 60068-2-27: 15 g, 11 ms
Ambient pollution degree	ATV58HU09M2–D12M2 and ATV58HU18N4–D23N4: Pollution degree 2 conforming to IEC 60664-1, EN50718, and NEMA ICS-1. ATV58HD16M2–D46M2 and ATV58HD28N4–D79N4: Pollution degree 3 conforming to IEC 60664-1, EN50718, and NEMA ICS-1. ATV58HC10N4X–C33N4X: Pollution degree 2 conforming to IEC 60664-1, EN 50718, and NEMA ICS-1. Protect the drive controller against dust, corrosive gas, and falling liquid.
Maximum relative humidity	95% maximum, without condensation and without dripping according to IEC 60068-2-3. Provide a heating system if there is condensation.
Maximum ambient temperature	Storage: -25 to +65 °C (-13 to +149 °F) Operation: ATV58HU09M2–U72M2 and ATV58HU18N4–U90N4:[1] -10 to +50 °C (+14 to 122 °F) without derating -10 to +60 °C (+14 to 140 °F) with fan kit[2] and derating of the current 2.2% per °C above 50 °C ATV58HU90M2–D46M2 and ATV58HD12N4–D79N4: -10 to +40 °C (+14 to 104 °F) without derating -10 to +50 °C (+14 to 122 °F) with fan kit[2] and derating of the current 2.2% per °C above 40 °C ATV58HC10N4X–C33N4X: -10 to +40 °C (+14 to 104 °F) without derating -10 to +50 °C (+14 to 122 °F) with derating of the current 2.2% per °C above 40 °C
Altitude	3300 ft (1000 m) maximum without derating. Derate the output current by 1% for each additional 330 ft (100 m).
Operating position	Vertical, ±10°, with power terminals at the bottom

1 ATV58HU54N4X, ATV58HU72N4X, and ATV58HU90N4X can be used at their highest VT rating in a 40 °C (104 °F) maximum ambient temperature.

2 See the Appendix for a list of accessories

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Table 12: Electrical Specifications

Input voltage	208 V -15% to 230 V +15%, single-phase input 208 V -15% to 230 V +15%, three-phase input 400 V -15% to 460 V + 20%, three-phase input[1]
Input frequency	50/60 Hz ±5%
Output voltage	Three-phase output, maximum voltage equal to input voltage
Galvanic isolation	Galvanic isolation between power and control (inputs, outputs, supplies)
Output frequency	0.1 to 60 Hz (configurable to 500 Hz with programming options)[2]
Switching frequency	4 kHz, configurable with programming accessories[2] ATV58HU09M2–D12M2 and ATV58HU18N4–D23N4: 0.5 - 1 - 2 - 4 - 8 kHz without derating 12 - 16 kHz with derating of 1 hp rating in steady state 12 - 16 kHz without derating and with reduced duty cycle[3] ATV58HD16M2–D23M2 and ATV58HD28N4–D46N4: 0.5 - 1 - 2 - 4 - 8 kHz without derating 8 - 12 kHz with derating of 1 hp rating in steady state 8 - 12 kHz without derating and with reduced duty cycle[3] ATV58HD28M2–D46M2 and ATV58HD54N4–D79N4: 0.5 - 1 - 2 - 4 kHz without derating 8 kHz with derating of 1 hp rating in steady state 4 - 8 kHz without derating and with reduced duty cycle[3] ATV58HC10N4X–C33N4X: 0.5 - 1- 2 kHz without derating 4 kHz without derating and with reduced duty cycle[3] 4 kHz with derating of 1 hp rating in steady state
Speed range	1:100 open loop (for example 0.6 Hz to 60 Hz) 1:20 open loop for ATV58HC10N4X–C33N4X
Speed regulation	1% of rated motor speed without adjustments or feedback. ±0.1% of rated motor speed with optional analog I/O card and appropriate tachometer feedback.[2] ±0.02% of rated motor speed with optional digital I/O card and appropriate encoder feedback.[2] 3% typical for ATV58HC10N4X–C33N4X
Efficiency	97% at full load typical
Displacement power factor	98% through speed range
Motor control algorithm	Sensorless flux vector control with a pulse width modulated (PWM) output wave form.
DC injection braking	Automatically on stopping as soon as frequency drops below 0.1 Hz for 0.5 seconds.
Braking torque	30% of nominal motor torque without dynamic braking (typical value). Up to 150% with the dynamic braking option (for constant torque ratings).

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Table 12: Electrical Specifications *(cont.)*

Transient output current	Constant torque: 160% of nominal NEC rated motor current for 60 seconds. Variable torque: 110% of nominal motor current for 60 seconds.
Transient motor torque (Constant torque ratings)	200% of nominal motor torque (typical value at ±10%) for 2 seconds 170% of nominal motor torque (typical value at ±10%) for 60 seconds
Drive controller protection	Protection against short circuits: • between output phases • between output phases and ground • on outputs of internal supplies Thermal protection against overheating and overcurrent. Undervoltage and overvoltage faults. Protection against single-phase input operation on the three-phase drive controllers.
Motor protection	Thermal protection integrated in the drive controller by continuous calculation of heat energy (I^2t), taking motor speed into account.[4] Motor thermal state is retained during loss of power. Motor thermal protection can be modified with a programming option to correspond to the type of motor cooling.[2] Protection against motor phase loss. Protection by motor thermal sensors with analog option card.[2]
Codes and standards	UL Listed per UL 508C as incorporating electronic overload protection: UL File E164874 CCN NMMS ATV58HU09M2 to D46M2 ATV58HU18N4 to D79N4 ATV58HC10N4X to C33N4X CSA Certified to CSA C22.2 No. 14. CSA File LR96921 Class 3211 06 ATV58HU09M2 to D46M2 ATV58HU18N4 to D79N4 CE Marked Conforms to applicable NEMA ICS, NFPA, IEC, and ISO 9001 standards.

1 The input voltage range is 460 V -10%, +15% on ATV58HU54N4X–D23N4X controllers as rated in Table 10 on page 17. The input voltage range is 400 V -15% to 460 V +10% on ATV58HC10N4X–C33N4X.

2 See the Appendix for a list of accessories.

3 The drive controller can be configured to reduce switching frequency if the drive thermal state reaches 95%. When the drive thermal state returns to 70%, the switching frequency returns to the set value. If the duty cycle (drive controller run time) does not exceed 60% (36 second maximum for a 60 second cycle) derating is not required.

4 Motor thermal protection can be set between 25 and 136% of the drive controller rating.

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DIMENSIONS

Figure 1: Frame Sizes 1–5

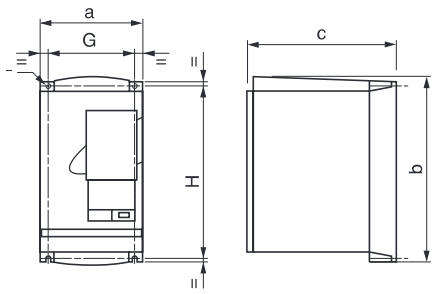


Table 13: Frame Sizes 1–5 Dimensions

Frame Size	Catalog No. ATV58H•••••	a in. (mm)	b in. (mm)	c in. (mm)	G in. (mm)	H in. (mm)	Ø in. (mm)	Weight lb (kg)
1	U09M2, U18M2	4.45 (113)	8.11 (206)	6.58 (167)	3.78 (96)	7.48 (190)	0.20 (5)	4.9 (2.2)
2	U29M2, U41M2, U18N4, U29N4, U41N4	5.91 (150)	9.06 (230)	7.24 (184)	5.20 (133)	8.27 (210)	0.20 (5)	8.4 (3.8)
3	U54M2, U72M2, U54N4, U72N4, U90N4	6.89 (175)	11.26 (286)	7.24 (184)	6.10 (155)	10.63 (270)	0.22 (5.5)	15.2 (6.9)
4	U90M2, D12M2, D12N4, D16N4	9.06 (230)	12.80 (325)	8.27 (210)	7.9 (200)	12.20 (310)	0.22 (5.5)	26 (11.9)
5	D23N4	9.06 (230)	16.35 (415)	8.27 (210)	7.9 (200)	15.75 (400)	0.22 (5.5)	31 (13.9)

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Figure 2: Frame Sizes 6 and 7

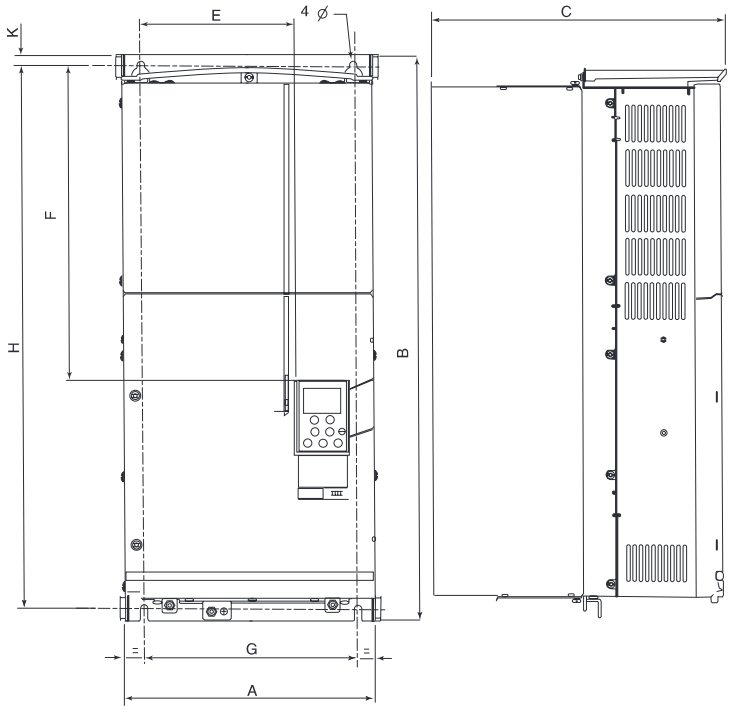


Table 14: Frame Sizes 6 and 7 Dimensions

Frame Size	Catalog No. ATV58H•••••	A in. (mm)	B in. (mm)	C in. (mm)	E in. (mm)	F in. (mm)	G In. (mm)	H In. (mm)	K In. (mm)	Ø in. (mm)	Weight lb (kg)
6	D16M2, D23M2, D28N4, D33N4, D46N4	9.45 (240)	21.65 (550)	11.14 (283)	5.75 (146)	12.05 (306)	8.07 (205)	20.87 (530)	0.39 (10)	0.28 (7)	75 (34)
7	D28M2, D33M2, D46M2, D54N4, D64N4, D79N4	13.78 (350)	25.59 (650)	11.97 (304)	9.29 (236)	15.35 (390)	11.81 (300)	24.37 (619)	0.39 (10)	0.36 (9)	126 (57)

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Figure 3: Frame Size 8

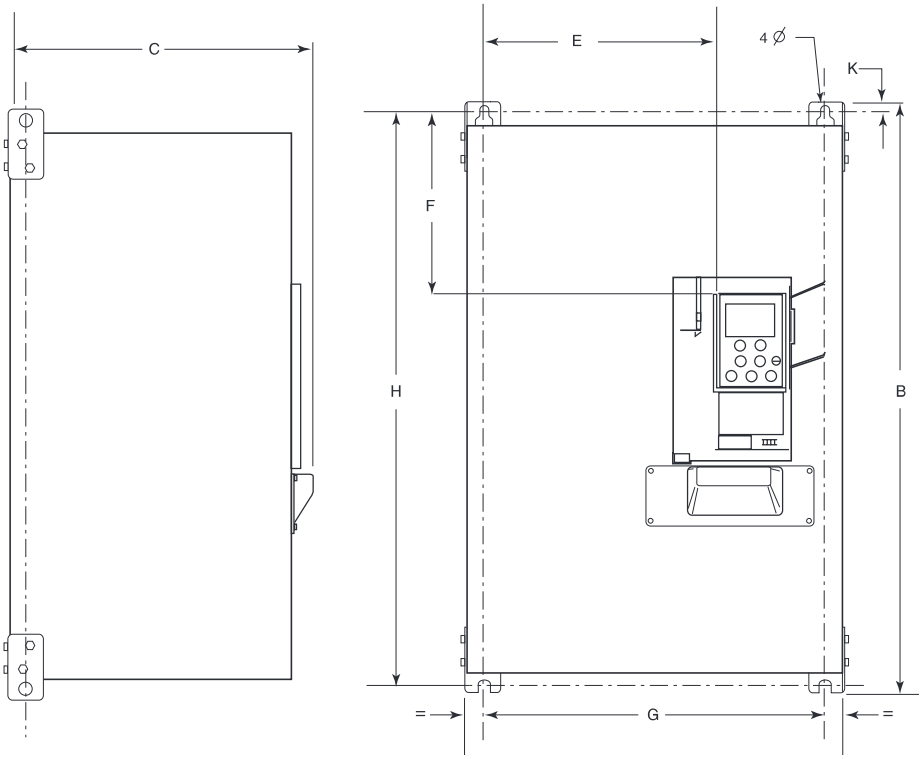


Table 15: Frame Size 8 Dimensions

Frame Size	Catalog No. ATV58H•••••	A in. (mm)	B in. (mm)	C in. (mm)	E in. (mm)	F in. (mm)	G In. (mm)	H In. (mm)	K In. (mm)	Ø in. (mm)	Weight lb (kg)
8	C10N4X	14.6 (370)	24.8 (630)	14.2 (360)	9.25 (235)	8.25 (210)	12.5 (317.5)	24 (609)	0.50 (13)	0.47 (12)	108 (49)

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Figure 4: Frame Size 9

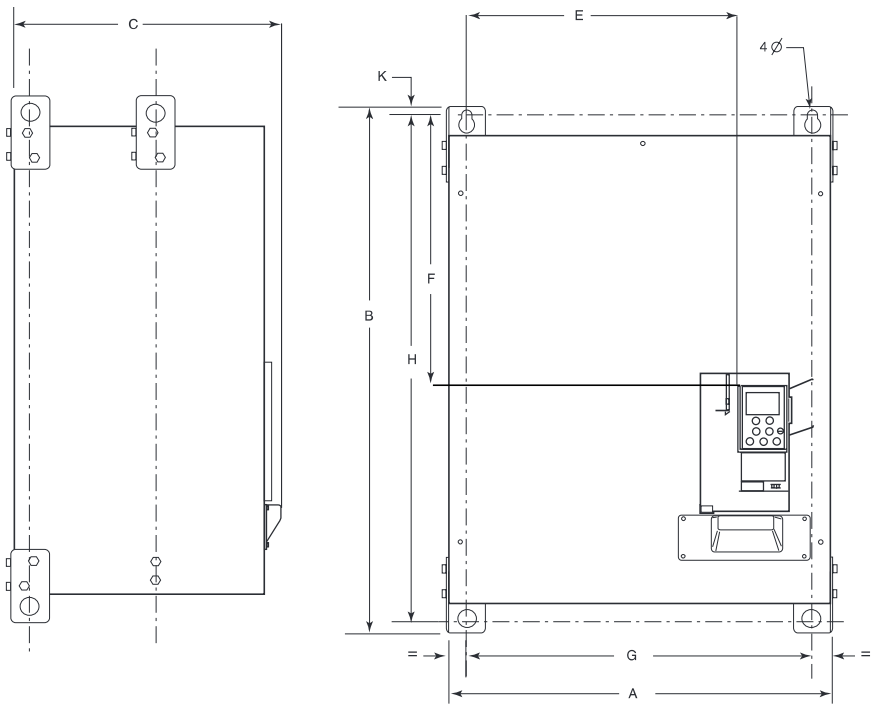


Table 16: Frame Size 9 Dimensions

Frame Size	Catalog No. ATV58H•••••	A in. (mm)	B in. (mm)	C in. (mm)	E in. (mm)	F in. (mm)	G In. (mm)	H In. (mm)	K In. (mm)	Ø in. (mm)	Weight lb (kg)
9	C13N4X C15N4X C19N4X	18.9 (480)	26.8 (680)	15.7 (400)	13.38 (340)	14.25 (362)	16.8 (426)	25.7 (652)	0.50 (13)	0.47 (12)	169 (77)

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Figure 5: Frame Size 10

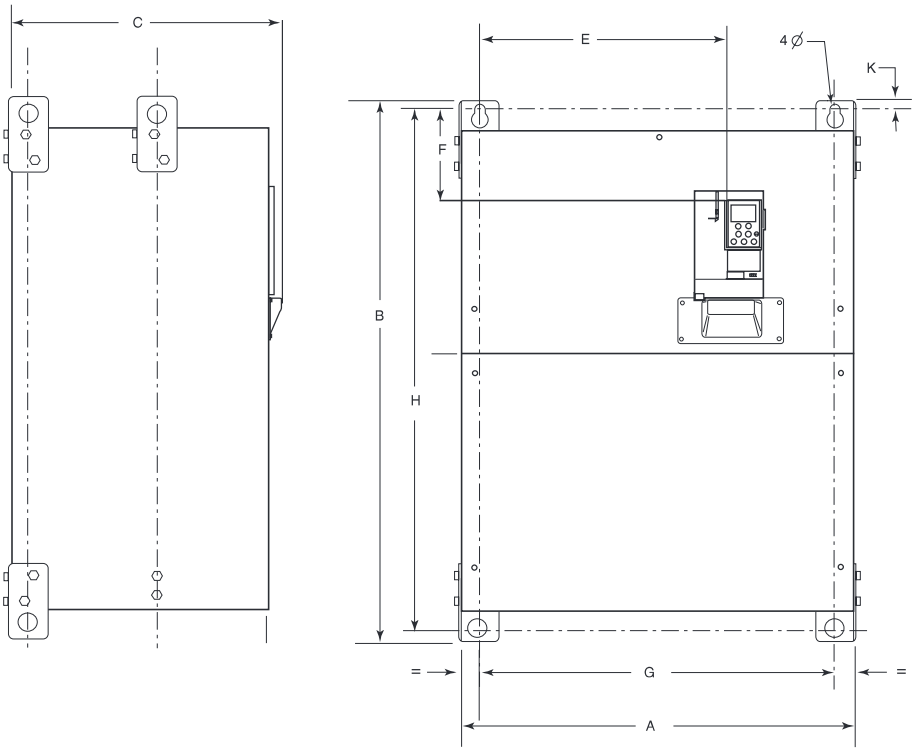


Table 17: Frame Size 10 Dimensions

Frame Size	Catalog No. ATV58H•••••	A in. (mm)	B in. (mm)	C in. (mm)	E in. (mm)	F in. (mm)	G In. (mm)	H In. (mm)	K In. (mm)	Ø in. (mm)	Weight lb (kg)
10	C23N4X C25N4X C28N4X C31N4X C33N4X	26 (660)	37.4 (950)	17.3 (440)	15.88 (403)	7.00 (178)	23.5 (598)	36.2 (920)	0.50 (13)	0.59 (15)	370 (168)

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INSTALLATION

Precautions

- The ATV58 *TRX* drive controller must be installed in a suitable environment. The environment around the drive controller must not exceed the pollution degree requirements defined in NEMA ICS-1 or IEC 60664. Refer to the ambient pollution degree ratings in Table 11.
- Install the drive controller vertically, +/- 10°, with the power terminals at the bottom. Do not place the drive controller near any heat sources.
- Leave at least 0.4 in. (10 mm) of free space in front of drive controllers ATV58HU09M2 to D12M2 and ATV58HU18N4 to D23N4. Leave at least 2 in. (50 mm) of free space in front of drive controllers ATV58HD16M2 to D46M2 and ATV58HD28N4 to HC33N4.
- Verify that the voltage and frequency of the input line match the drive controller nameplate rating.
- Install a disconnect device on the input line side of the drive controller in accordance with national and local codes.
- Overcurrent protection is required. Refer to Tables 34–39 on pages 67–74 for recommended overcurrent protection.

⚠ DANGER

HAZARDOUS VOLTAGE

Turn off all power supplying this equipment before working on or inside the equipment.

Failure to follow this instruction will result in death or serious injury.

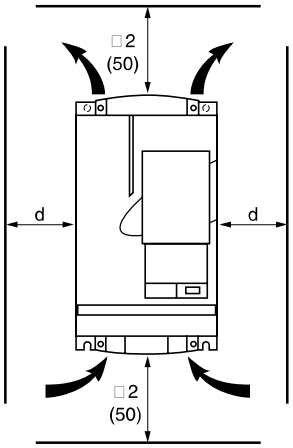
- Figures 6–8 on pages 27–28 show the minimum clearances required around each drive controller for unobstructed air flow. **Do not** use these clearances as the minimum enclosure size for proper thermal dissipation.

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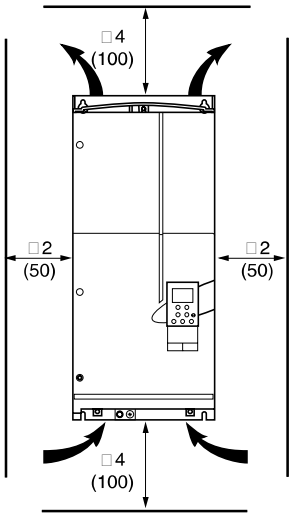
Clearances

Figure 6: Minimum Clearances: ATV58HU18N4 to D23N4



Dimensions: in. (mm)

Figure 7: Minimum Clearances: ATV58HD28N4X to D79N4X

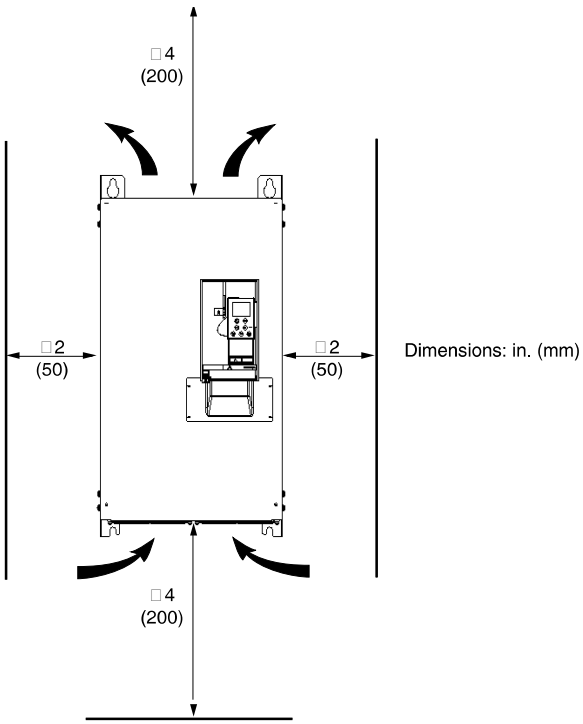


Dimensions: in. (mm)

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Figure 8: Minimum Clearances: ATV58HC10N4X to C33N4X (ATV58HC19N4 Illustrated)



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Mounting and Temperature Conditions (Refer to Figures 6–8)

ATV58HU09M2 to U72M2 and ATV58HU18N4 to U90N4:

- From -10 to 40 °C (+14 to 104 °F):

  For d ≥ 2 in. (50 mm): no special precautions.

  For d < 2 in. (50 mm): remove the protective cover from the top of the drive controller as shown in Figure 9 on page 30.

- From 40 to 50 °C (104 to 122 °F):

  For d ≥ 2 in. (50 mm): remove the protective cover from the top of the drive controller as shown in Figure 9.

  For d < 2 in. (50 mm): add the control ventilation kit VW3A5882• (see catalog 8806CT9801).

- From 50 to 60 °C (122 to 140 °F):

  For d ≥ 2 in. (50 mm): add the ventilation fan. See the Appendix for a list of accessories. Derate the current used by 2.2% per °C above 50 °C.

- Leave at least 0.4 in. (10 mm) of free space in front of the drive controller.

ATV58HU90M2 to D46M2 and ATV58HD12N4 to HC33N4:

- From -10 to 40 °C (+14 to 104 °F):

  For d ≥ 2 in. (50 mm): no special precautions.

  For d < 2 in. (50 mm): remove the protective cover from the top of the drive controller as shown in Figure 9.

- From 40 to 50 °C (104 to 122 °F):

  For d ≥ 2 in. (50 mm): remove the protective cover from the top of the drive controller as shown in Figure 9. Derate the current used by 2.2% per °C above 40 °C.

  For d < 2 in. (50 mm): add the ventilation fan. See the Appendix for a list of accessories. Derate the current used by 2.2% per °C above 40 °C.

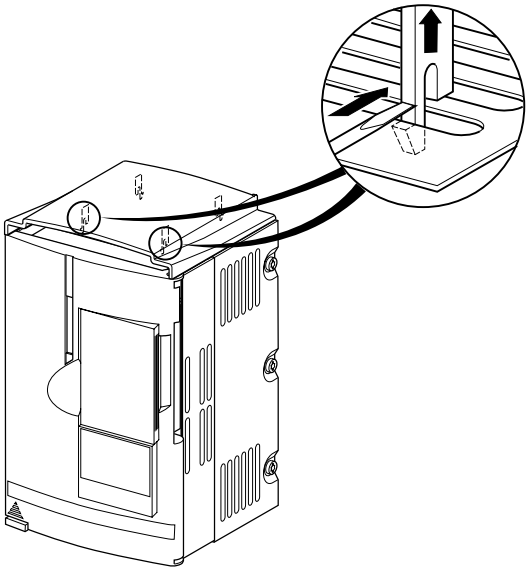
- Leave at least 0.4 in. (10 mm) of free space in front of drive controllers ATV58HU90M2 to D12M2 and ATV58HD12N4 to D23N4.

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- Leave at least 2 in. (50 mm) of free space in front of drive controllers ATV58HD16M2 to HD46M2 and ATV58HD28N4 to HC33N4.
- Refer to Figure 8 on page 28 for minimum clearances for ATV58HC10N4 to HC33N4. There are no ventilation fan kit options for these units. For operation up to 50 °C (122 °F), derate the operating current by 2.2% per °C above 40 °C.

Figure 9: Removing the Protective Cover



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Mounting in a General-Purpose Metal Enclosure

Follow the installation precautions given on pages 26 to 30.

To ensure sufficient air circulation in the drive controller:

- Provide ventilation inlets and outlets in the enclosure as shown in Figure 10.
- If the enclosure does not provide sufficient free air flow, an enclosure ventilation fan is required to exhaust the heat outside of the enclosure. The enclosure fan should have a greater fan flow rate than the drive controller fan flow rate listed in Table 18.
- Use dust filters if a ventilation fan is required.

If there is a possibility of condensation, keep the power supply on while the motor is not running, or install thermostatically controlled strip heaters.

Figure 10: Ventilation for General Purpose Enclosures

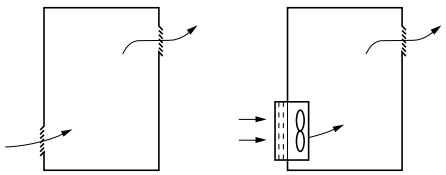


Table 18: ATV58 *TRX* Fan Flow Rates

Drive Controller ATV58H•••••	Fan Flow Rate	
U09M2, U18M2	Non-ventilated	
U29M2, U18N4, U29N4, U41N4, U54N4	36 m^3/hour	21 CFM
U41M2	47 m^3/hour	27.5 CFM
U54M2, U72M2, U54N4, U72N4, U90N4	72 m^3/hour	42 CFM
U90M2, D12M2, D12N4, D16N4, D23N4	72 m^3/hour	42 CFM
D16M2, D23M2, D28N4, D33N4, D46N4	161 m^3/hour	94 CFM
D28M2, D33M2, D46M2, D54N4, D64N4, D79N4	343 m^3/hour	200 CFM
C10N4X	600 m^3/hour	350 CFM
C13N4X, C15N4X, C19N4X	900 m^3/hour	525 CFM
C23N4X, C25N4X, C28N4X, C31N4X, C33N4X	900 m^3/hour	525 CFM

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Mounting in a Type 12 or IP54 Metal Enclosure

Certain conditions such as dust, corrosive gas, high humidity with the risk of condensation, and dripping water may require Type 12 or IP54 protection.

When mounting the controller in a Type 12 or IP54 enclosure, follow the installation precautions on pages 26–30.

To prevent hot spots in the drive controller if it is non-ventilated, use a ventilation fan kit, VW3A5882•, to circulate the air inside the enclosure. With the fan kit, the maximum allowable temperature inside the enclosure is 60 °C.

- Derate the current used by 2.2% per °C above 50 °C for ATV58HU09M2–U72M2 and ATV58HU18N4–U90N4.
- Derate current used by 2.2% per °C above 40 °C for ATV58HU90M2–D46M2 and ATV58HD12N4–HC33N4.
- If there is the possibility of condensation, keep the power supply on while the motor is not running, or install thermostatically controlled strip heaters.

Calculating the Enclosure Size

Consider the following points when sizing the enclosure:

- Use only metallic enclosures, since they have good thermal conduction.
- Account for radiant or convected heat from external sources. Do not install enclosures where external heat sources (such as direct sunlight) can add to the enclosure heat load.
- If additional devices are present inside the enclosure, factor the heat load of the devices into the calculation.
- Refer to Tables 1–10 on pages 10–17 for the drive controller total dissipated power (watts loss) at rated load.
- The actual useful area for convection cooling of the enclosure varies depending on the mounting method. The mounting method must allow free air movement over all surfaces considered for convection cooling.

Contact your local Schneider Electric representative or the enclosure manufacturer for assistance in selecting the proper enclosure size and type for your application and installation environment.

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Electromagnetic Compatibility (EMC)

The ATV58 *TRX* drive controller is considered to be a component. It is neither a machine nor a piece of equipment ready for use in accordance with the European Community (CE) directives (machinery directive or electromagnetic compatibility directive). The user is responsible for ensuring that the machine meets these standards.

A metal EMC plate is available for ATV58 *TRX* drive controllers to assist in meeting the European Community EMC directives. This kit is for integrators and end users who include the drive controller as part of a machine to be exported to Europe requiring compliance to these directives.

See the Appendix for a list of accessories. Instruction bulletin no. 30072-450-04 ships with the EMC plate kit and contains information about its use.

ATV58 *TRX* drive controllers are marked with the CE European Community mark.

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WIRING

⚠ DANGER

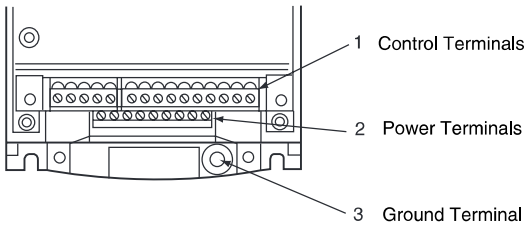
HAZARDOUS VOLTAGE

Turn off all power supplying this equipment before working on or inside the equipment.

Failure to follow this instruction will result in death or serious injury.

Before wiring the drive controller, first perform the bus voltage measurement procedure on page 42. Figures 11–18 show the location of the terminal strips.

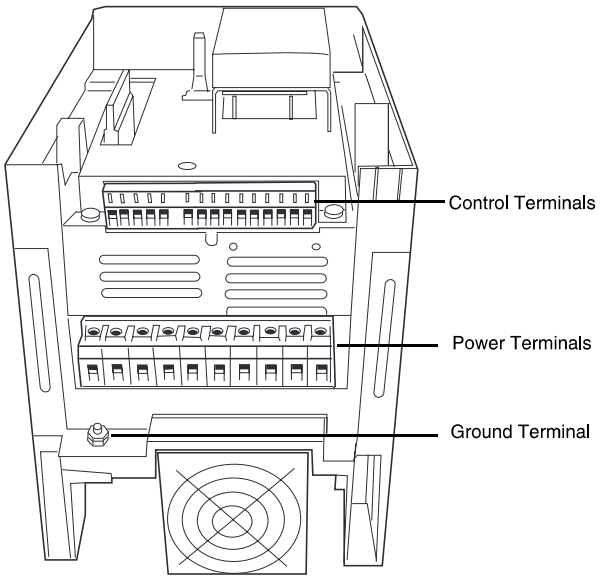
Figure 11: Terminal Locations (Frame Size 1)



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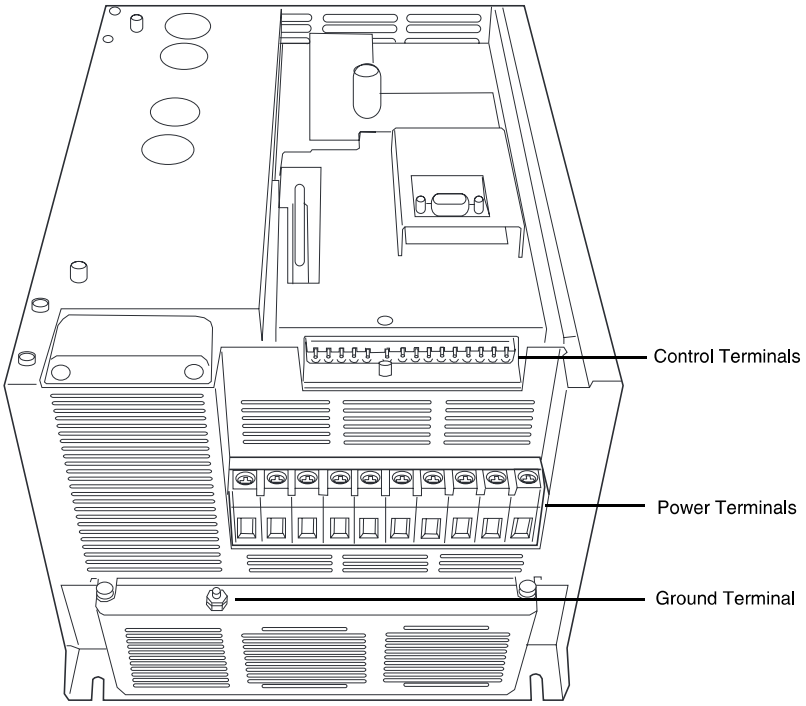
Figure 12: Terminal Locations (Frame Sizes 2 and 3)



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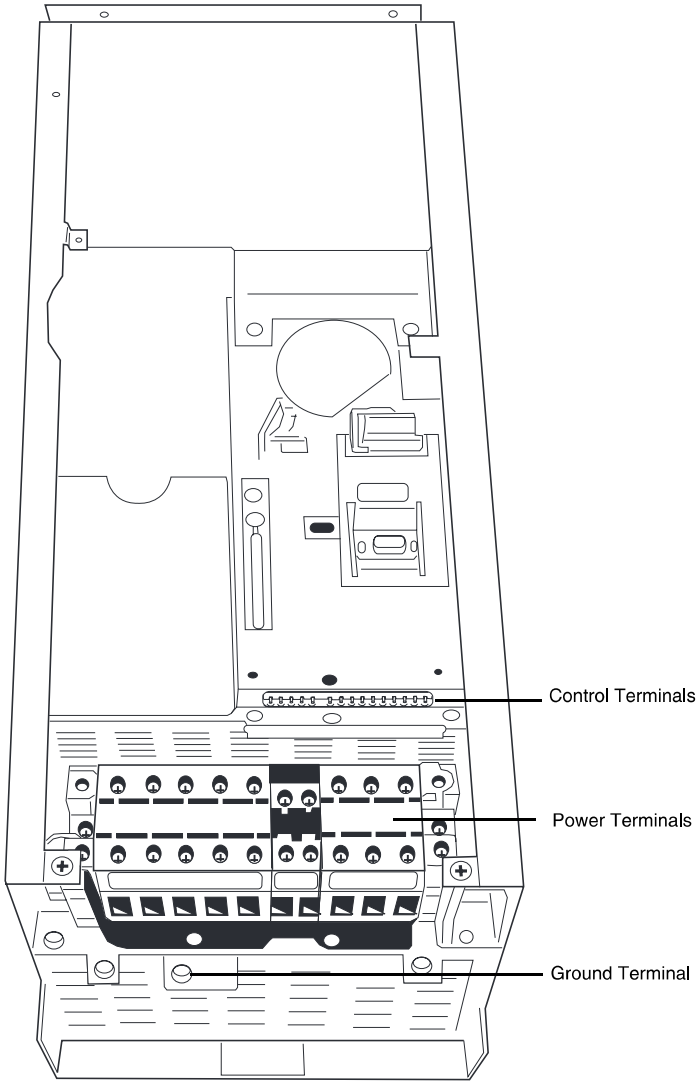
Figure 13: Terminal Locations (Frame Sizes 4 and 5)



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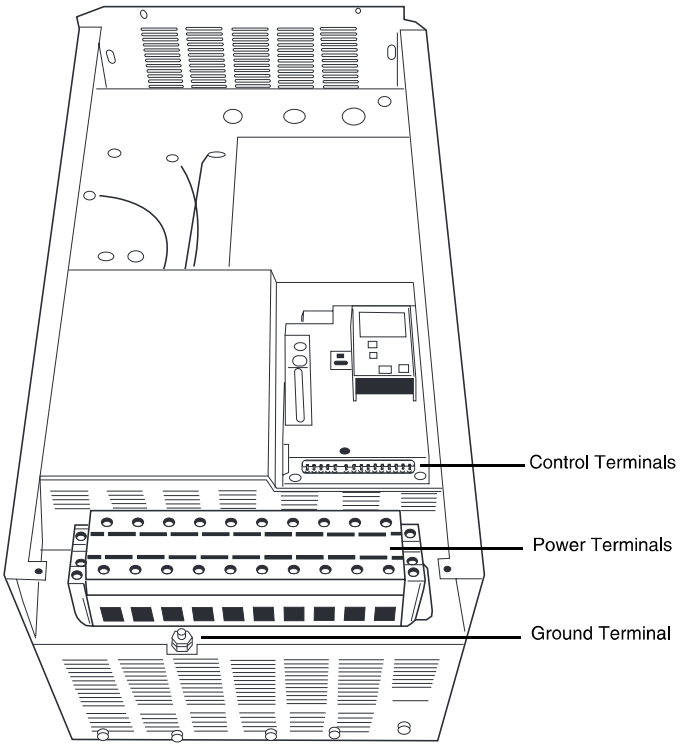
Figure 14: Terminal Locations (Frame Size 6)



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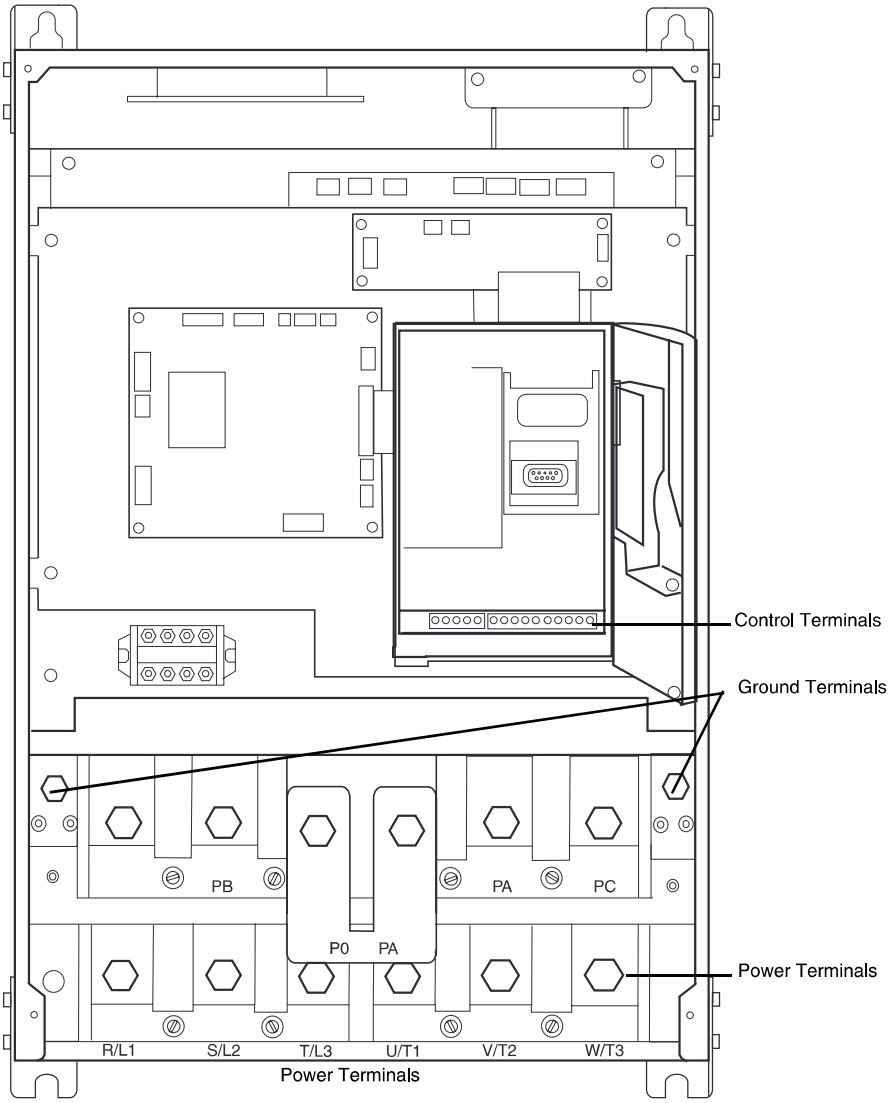
Figure 15: Terminal Locations (Frame Size 7)



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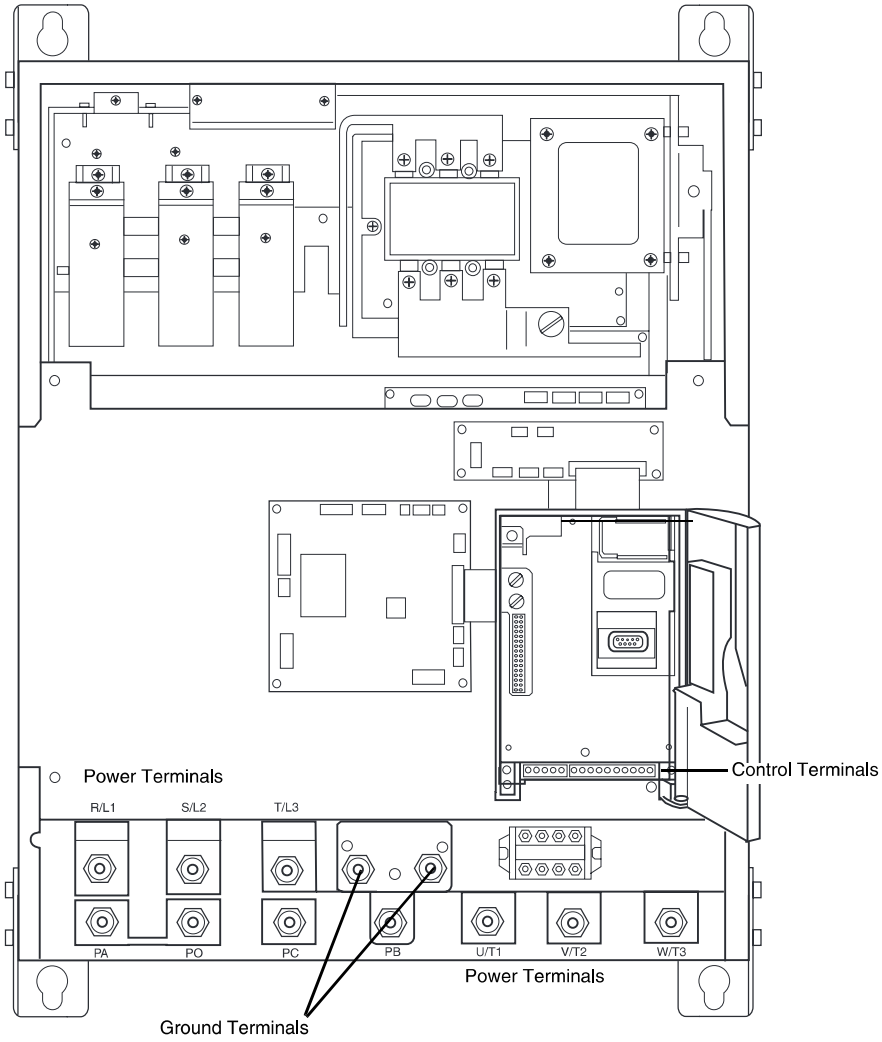
Figure 16: Terminal Locations (Frame Size 8)



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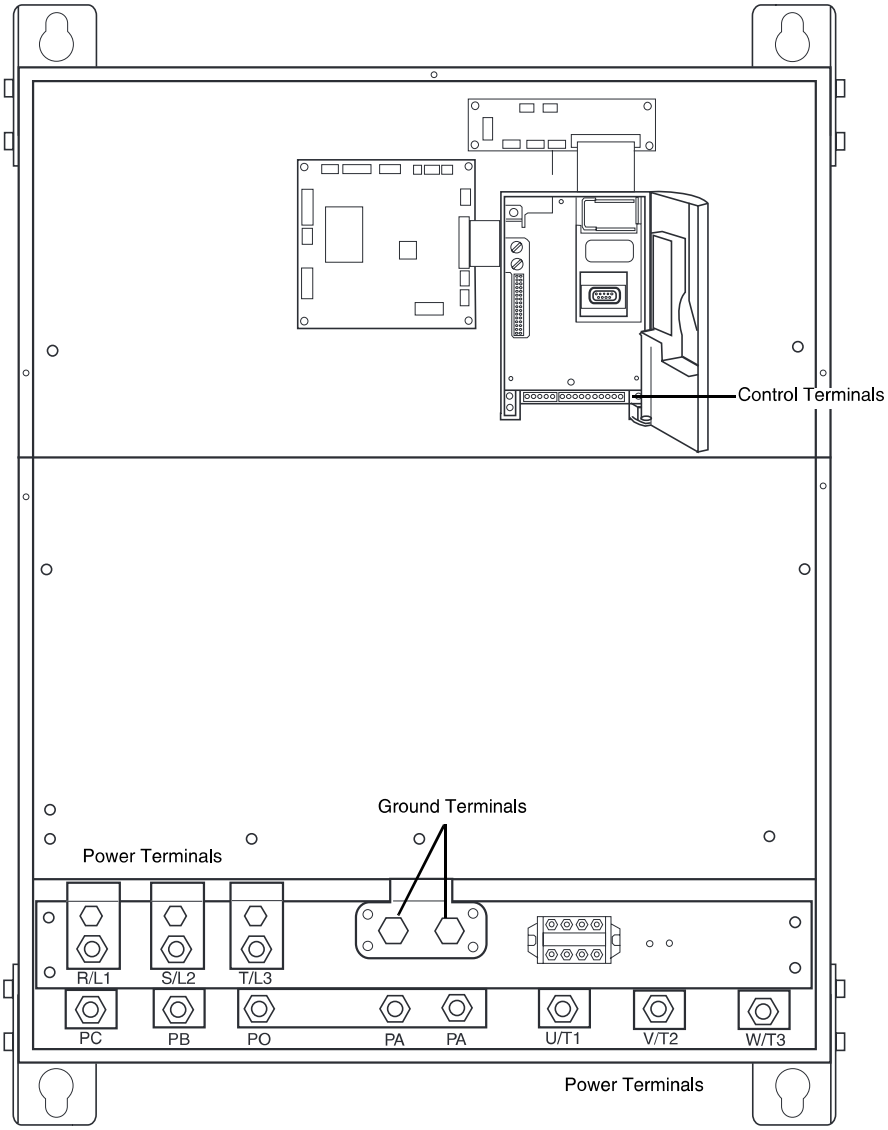
Figure 17: Terminal Locations (Frame Size 9)



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Figure 18: Terminal Locations (Frame Size 10)



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Bus Voltage Measurement Procedure

⚠ DANGER

HAZARDOUS VOLTAGE

- This equipment must only be installed and serviced by qualified electrical personnel.
- Read and understand the bus voltage measurement procedure before performing the procedure.
- DO NOT short across DC bus capacitors or touch unshielded components or terminal strip screw connections with voltage present.
- Many parts in this drive controller, including printed wiring boards, operate at line voltage. DO NOT TOUCH.
- Always use a properly-rated voltage sensing device to confirm that the power is off.

Electric shock will result in death or serious injury.

The DC bus voltage level is determined by monitoring the (+) and (–) measurement points. Their location varies by drive controller model number as listed in Table 19 and shown in Figure 19 on page 44. The drive controller model number is listed on its nameplate.

Table 19: (+) and (–) Measurement Points

Drive Controller ATV58H•••••	(+) Measurement Point		(–) Measurement Point	
	Terminal Block or Connector	Terminal Designation	Terminal Block or Connector	Terminal Designation
U09M2• and U18M2•	J2	(+)	J2	(–)
U29M2• to D12M2•	J2	PA	J18	7
U18N4• to D23N4•				
D16M2• to D46M2•	J2	(+)	J2	(–)
D28N4• to D79N4•				
C10N4X to C33N4X	J2	PA (+)	J2	PC (–)

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To measure the DC bus capacitor voltage:

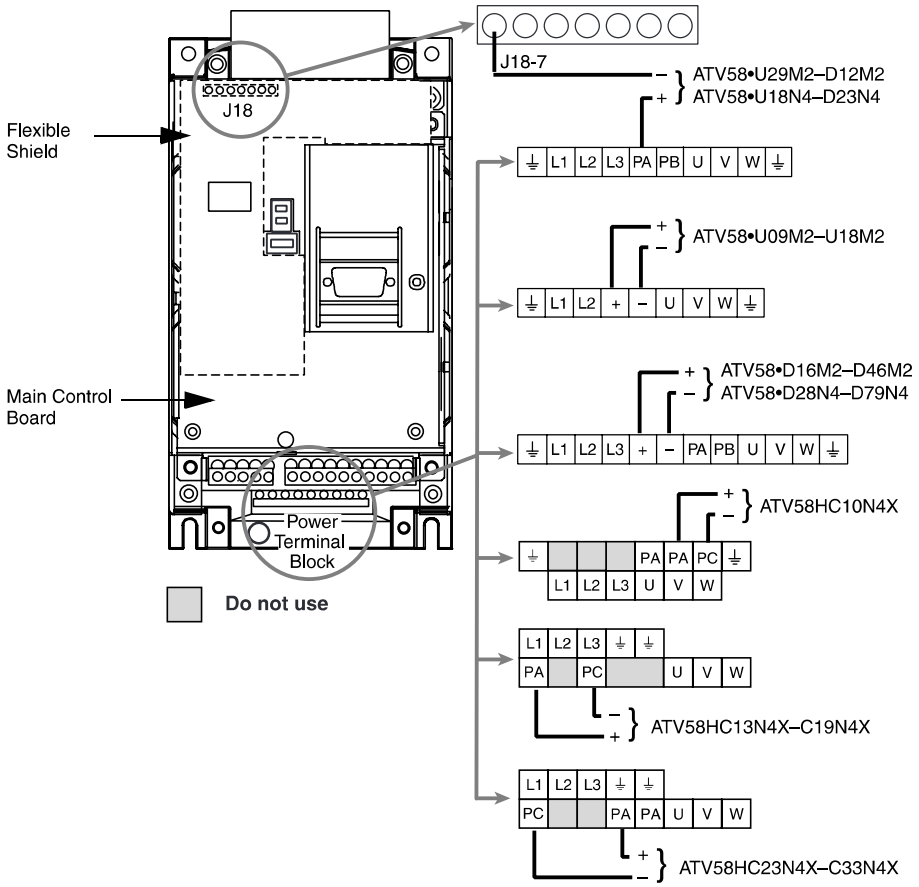
1. Disconnect all power from the drive controller including external control power that may be present on the control board and the option board terminals.
2. Wait ten minutes for the DC bus capacitors to discharge.
3. Read the model number of the drive controller from the nameplate and identify the corresponding (+) and (–) measurement points from Table 19 and Figure 19.
4. Open the door or cover of the drive controller.
5. Set the voltmeter to the 1000 Vdc scale. Measure the voltage between the (+) and (–) measurement points identified in Step 3. Verify that the DC bus voltage has discharged below 45 V before servicing the drive controller.
6. If the DC bus capacitors will not discharge below 45 V, contact your local Square D representative. **Do not operate the drive controller.**
7. Replace the covers after servicing the drive controller.

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Figure 19: DC Bus Measurement Terminals

The J18 connector is in the upper left corner of the main control board behind the flexible shield. Use a thin probe to access the connector pin.



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General Wiring Practices

Good wiring practice requires the separation of control wiring from power wiring. Power wiring to the motor must have the maximum possible separation from all other power wiring, whether from the same drive controller or other drive controllers. **Do not run power and control wiring, or multiple power wiring, in the same conduit.** This separation reduces the possibility of coupling electrical transients from power circuits into control circuits or from motor power wiring into other power circuits.

⚠ CAUTION

IMPROPER WIRING PRACTICES

Follow the wiring practices described in this document in addition to those already required by the National Electrical Code and local electrical codes.

Failure to follow this instruction can result in injury or equipment damage.

Follow the practices below when wiring ATV58 *TRX* drive controllers:

- Use metallic conduit for all drive controller wiring. Do not run control and power wiring in the same conduit.
- When using metallic conduit, use metal conduit kits. See the Appendix for a list of the conduit kits.
- Separate metallic conduits carrying power wiring or low-level control wiring by at least 3 in. (76 mm).
- Separate non-metallic conduits or cable trays used to carry power wiring from metallic conduit carrying low-level control wiring by at least 12 in. (305 mm).
- Always cross power and control wiring at right angles.
- Equip all inductive circuits near the drive (such as relays, contactors, and solenoid valves) with noise suppressors, or connect them to a separate circuit.

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Branch Circuit Connections

Refer to NEC Article 430 for the sizing of the branch circuit conductors. All branch circuit components and equipment (such as transformers, feeder cables, disconnect devices, and protective devices) must be rated for the input line current of the ATV58 *TRX* drive controller, or the rated output current, whichever value is larger. The input line current of the controller depends on the impedance of the power distribution system and the available fault current at the drive controller input terminals.

Select the input current corresponding to the available fault current capability (AIC) or to the line impedance present. If the available fault current capability of the branch circuit is limited by fuses or circuit breakers (not system impedance), use the available fault current capability on the line side of the fuses or circuit breakers to select the drive controller input current. The input current values for the variable torque drive controller ratings are based on nominal NEC rated motor currents. The input current values for the constant torque drive controller ratings are based on drive controller rated output currents. Tables 20–29 on pages 47–55 provide input current information to optimally size branch circuit conductors.

NOTE: The branch circuit feeder protection rating should not be less than the rated output current of the drive controller.

⚠ WARNING

IMPROPER OVERCURRENT COORDINATION

- Protective devices must be properly coordinated.
- The National Electrical Code requires branch circuit protection. Use the fuses recommended in Tables 34–36 on pages 67–69 of this manual to achieve published fault withstand current ratings.
- Do not connect the drive controller to a power feeder whose short circuit capacity exceeds the drive controller withstand fault rating listed on the drive controller nameplate or Tables 20 to 29 (pages 47 to 55).

Failure to follow these instructions can result in death, serious injury, or equipment damage.

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Table 20: Single-Phase Input Line Currents, Constant Torque, 208/230 V Ratings, Switching Frequency@4 kHz

NOTE: The input conductor ampacity rating should not be less than the ampacity rating selected based on the rated controller output current.

Drive Controller Catalog Number	Motor Power 208/230 V		Output Current	Input Line Current							
				2000 AIC		5000 AIC		22000 AIC		w/ Additional 3% Line Impedance 22000 AIC	
	kW	hp	A	208 V A	230 V A	208 V A	230 V A	208 V A	230 V A	208 V A	230 V A
ATV58HU09M2•	0.37	0.5	2.3	5.6	4.7	—	—	—	—	4.2	3.8
ATV58HU18M2•	0.75	1	4.1	9.8	8.3	—	—	—	—	7.9	7.0
ATV58HU29M2•	1.5	2	7.8	—	—	18.5	15.6	—	—	14.1	12.3
ATV58HU41M2•	2.2	3	11	—	—	25.6	21.6	—	—	20.5	17.5
ATV58HU72M2•[1]	3	4	13.7	—	—	25.1	22.7	—	—	23.3	20.6
ATV58HU90M2•[1]	4	5	18.2	—	—	27.5	24.8	30.7	27.6	32.3	28.6
ATV58HD12M2•[1]	5.5	7.5	24.2	—	—	39.8	36.6	44.9	40	42.5	37.6

[1] A 3% line reactor must be used when supplied with single-phase input.

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Table 21: Single-Phase Input Line Currents, Variable Torque Low Noise, 208/230 V Ratings, Switching Frequency: ATV58HU09M2–D12M2 @ 8 kHz, ATV58HD16M2–D46M2 @ 4kHz

NOTE: The input conductor ampacity rating should not be less than the ampacity rating selected based on the rated controller output current.

Drive Controller Catalog Number	Motor Power 208/230 V		Output Current	Input Line Current							
				2000 AIC		5000 AIC		22000 AIC		w/ Additional 3% Line Impedance 22000 AIC	
	kW	hp	A	208 V A	230 V A	208 V A	230 V A	208 V A	230 V A	208 V A	230 V A
ATV58HU09M2•	0.37	0.5	2.3	5.6	4.7	—	—	—	—	4.2	3.8
ATV58HU18M2•	0.75	1	4.8	9.8	8.3	—	—	—	—	7.9	7.0
ATV58HU29M2•	1.5	2	7.8	—	—	18.5	15.6	—	—	14.1	12.3
ATV58HU41M2•	2.2	3	11	—	—	25.6	21.6	—	—	20.5	17.5
ATV58HU72M2• [1]	3	4	14.3	—	—	25.1	22.7	—	—	23.3	20.6
ATV58HU90M2• [1]	4	5	17.5	—	—	27.5	24.8	35	30	32.3	28.6
ATV58HD12M2• [1]	5.5	7.5	25.3	—	—	39.8	36.6	46	39.4	42.5	37.6
ATV58HD16M2• [1]	7.5	10	30.8	—	—	—	—	—	—	60	53
ATV58HD23M2• [1]	11	15	46.2	—	—	—	—	—	—	86	76
ATV58HD28M2• [1]	15	20	60	—	—	—	—	—	—	115	102
ATV58HD33M2• [1]	18.5	25	75	—	—	—	—	—	—	141	125
ATV58HD46M2• [1]	22	30	88	—	—	—	—	—	—	168	149

[1] A 3% line reactor must be used when supplied with single-phase input.

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Table 22: Three-Phase Input Line Currents, Constant Torque, 208/230 V Ratings, Switching Frequency: ATV58HU29M2–D23M2 @ 4kHz, ATV58HD28M2–D46M2 @ 2 kHz

NOTE: The input conductor ampacity rating should not be less than the ampacity rating selected based on the rated controller output current.

Drive Controller Catalog Number	Motor Power 208/230 V		Output Current	Input Line Current							
				5000 AIC		10000 AIC		22000 AIC		w/ Additional 3% Line Impedance 22000 AIC	
	kW	hp	A	208 V A	230 V A	208 V A	230 V A	208 V A	230 V A	208 V A	230 V A
ATV58HU29M2•	1.5	2	7.8	9.7	8.3	—	—	—	—	6.6	5.9
ATV58HU41M2•	2.2	3	11	13.4	11.4	—	—	—	—	9.5	8.5
ATV58HU54M2•	3	4	13.7	17.2	15	—	—	—	—	12.6	11.2
ATV58HU72M2•	4	5	18.2	22.4	19.5	—	—	—	—	16.9	14.6
ATV58HU90M2	5.5	7.5	24.2	30	26.4	32.1	28.4	34.7	30	23.3	20.6
ATV58HD12M2•	7.5	10	31	39.7	35	42.3	37.4	44.4	38.2	32.3	28.6
ATV58HD16M2•	11	15	47	42.4	43.1	42.8	43.3	43.4	43.6	43.4	43.0
ATV58HD23M2•	15	20	60	58	58.5	58.2	58.3	58.5	58.7	58.5	58.7
ATV58HD28M2•	18.5	25	75	70.2	70.4	70.6	70.4	70.2	70.4	69.4	70.0
ATV58HD33M2•	22	30	88	82.3	82.7	82.5	83.9	84.0	84.0	83.2	83.6
ATV58HD46M2•	30	40	116	100.8	102.2	101.2	103.2	101.7	101.5	101.7	103.7

Table 23: Three-Phase Input Line Currents, Constant Torque Low Noise, 208/230 V Ratings, Switching Frequency: ATV58HD16M2–D23M2 @ 8 kHz, ATV58HD28M2–D46M2 @ 4 kHz

NOTE: The input conductor ampacity rating should not be less than the ampacity rating selected based on the rated controller output current.

Drive Controller Catalog Number	Motor Power 208/230 V		Output Current	Input Line Current							
				5000 AIC		10000 AIC		22000 AIC		w/ Additional 3% Line Impedance 22000 AIC	
	kW	hp	A	208 V A	230 V A	208 V A	230 V A	208 V A	230 V A	208 V A	230 V A
ATV58HD16M2•	7.5	10	31	36.2	37.1	36.5	37.2	36.8	37.2	36.7	37.3
ATV58HD23M2•	11	15	47	43.2	43.5	43.3	43.9	44.0	44.5	43.3	43.8
ATV58HD28M2•	15	20	60	58.3	58.9	58.3	59.3	58.6	59.3	58.3	58.8
ATV58HD33M2•	18.5	25	75	71.0	71.7	71.3	72.5	72.6	73.5	72.6	73.4
ATV58HD46M2•	22	30	88	82.3	83.3	84.7	85.7	85.3	86.6	85.0	86.8

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Table 24: Three-Phase Input Line Currents, Variable Torque, 208/230 V Ratings, Switching Frequency: ATV58HU29M2–D23M2 @ 4 kHz, ATV58HD28M2–D46M2 @ 2 kHz

NOTE: The input conductor ampacity rating should not be less than the ampacity rating selected based on the rated controller output current.

Drive Controller Catalog Number	Motor Power 208/230 V		Output Current	Input Line Current							
				5000 AIC		10000 AIC		22000 AIC		w/ Additional 3% Line Impedance 22000 AIC	
	kW	hp	A	208 V A	230 V A	208 V A	230 V A	208 V A	230 V A	208 V A	230 V A
ATV58HU29M2•	1.5	2	7.5	9.4	8.6	—	—	—	—	6.6	5.9
ATV58HU41M2•	2.2	3	10.6	13	11.8	—	—	—	—	9.5	8.5
ATV58HU54M2•	3	4	14.3	17.2	15	—	—	—	—	12.6	11.2
ATV58HU72M2•	4	5	16.7	21.4	19.5	—	—	—	—	16.9	14.6
ATV58HU90M2	5.5	7.5	24.2	29	26.4	32.1	28.4	34.7	30	23.3	20.6
ATV58HD12M2•	7.5	10	30.8	38.3	35	42.3	37.4	44.4	38.2	32.3	28.6
ATV58HD16M2•	11	15	46.2	41.7	37.8	41.7	38.0	41.7	38.0	41.7	38.0
ATV58HD16M2•	15	20	60	55.5	50.5	55.7	50.5	55.7	50.8	55.1	50.5
ATV58HD23M2•	18.5	25	75	67.0	61.8	67.2	61.8	67.2	61.8	67.1	61.4
ATV58HD28M2•	22	30	88	80.5	73.3	80.6	73.3	80.9	73.6	80.7	73.6
ATV58HD33M2•	30	40	116	107.6	97.9	108.4	97.9	108.4	98.5	107.6	98.5
ATV58HD46M2•	37	50	143	134.8	121.2	135.4	121.2	135.5	124.0	135.0	123.7

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Table 25: Three-Phase Input Line Currents, Variable Torque Low Noise, 208/230 V Ratings, Switching Frequency: ATV58HU29M2–D23M2 @ 8 kHz, ATV58HD28M2–D46M2 @ 4 kHz

NOTE: The input conductor ampacity rating should not be less than the ampacity rating selected based on the rated controller output current.

Drive Controller Catalog Number	Motor Power 208/230 V		Output Current	Input Line Current							
				5000 AIC		10000 AIC		22000 AIC		w/ Additional 3% Line Impedance 22000 AIC	
	kW	hp	A	208V A	230 V A	208 V A	230 V A	208 V A	230 V A	208 V A	230 V A
ATV58HU29M2•	1.5	2	7.5	9.4	8.6	—	—	—	—	6.6	5.9
ATV58HU41M2•	2.2	3	10.6	13	11.8	—	—	—	—	9.5	8.5
ATV58HU54M2•	3	4	14.3	17.2	15	—	—	—	—	12.6	11.2
ATV58HU72M2•	4	5	16.7	21.4	19.5	—	—	—	—	16.9	14.6
ATV58HU90M2	5.5	7.5	24.2	29	26.4	32.1	28.4	34.7	30	23.3	20.7
ATV58HD12M2•	7.5	10	30.8	38.3	35	35.7	32.4	35.8	32.8	35.2	32.8
ATV58HD16M2•	11	15	46.2	42.7	39.0	42.7	39.0	42.7	39.0	42.4	39.0
ATV58HD23M2•	15	20	60	55.2	48.9	55.2	50.5	55.4	51.2	55.4	50.7
ATV58HD28M2•	18.5	25	75	67.8	61.9	68.2	62.1	68.4	62.6	67.6	61.6
ATV58HD33M2•	22	30	88	82.0	73.8	82.0	75.1	82.8	76.7	82.8	76.5
ATV58HD46M2•	30	40	116	108.6	97.3	109.2	99.2	109.7	99.7	109.4	99.7

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Table 26: Three-Phase Input Line Currents, Constant Torque, 400/460 V Ratings, Switching Frequency: ATV58HU18N4–D46N4 @ 4 kHz, ATV58HD54N4–C33N4X @ 2 kHz

NOTE: The input conductor ampacity rating should not be less than the ampacity rating selected based on the rated controller output current.

Drive Controller Catalog Number	Motor Power		Output Current	Input Line Current							
				5000 AIC		10000 AIC		22000 AIC		w/ Additional 3% Line Impedance 22000 AIC	
	400 V kW	460 V hp	A	400 V A	460 V A	400 V A	460 V A	400 V A	460 V A	400 V A	460 V A
ATV58HU18N4•	0.75	1	2.3	3.4	2.6	—	—	—	—	1.9	1.6
ATV58HU29N4•	1.5	2	4.1	6.0	4.5	—	—	—	—	3.3	3.0
ATV58HU41N4•	2.2	3	5.8	7.8	6	—	—	—	—	4.8	4.2
ATV58HU54N4•	3	4	7.8	10.2	7.8	—	—	—	—	6.3	5.6
ATV58HU72N4•	4	5	10.5	13.0	10.1	—	—	—	—	8.6	7.2
ATV58HU90N4•	5.5	7.5	13	17.0	13.2	—	—	—	—	11.8	10.1
ATV58HD12N4•	7.5	10	17.6	20.7	18.2	22.7	19.9	26.5	21	16	13.2
ATV58HD16N4•	11	15	24.2	28.8	25.3	31.4	27.6	35.4	28	23.6	19.5
ATV58HD23N4•	15	20	33	36.5	32	39.6	34.7	44.7	35.6	30.6	25.8
ATV58HD28N4•	18.5	25	40.7	37.3	38.3	37.9	39.2	38.9	40.1	38.7	40.0
ATV58HD33N4•	22	30	48.4	44.4	44.8	45.9	46.7	46.5	47.6	46.4	47.6
ATV58HD46N4•	30	40	66	59.1	59.9	61.2	61.9	62.0	61.9	62.1	63.7
ATV58HD54N4•	37	50	79.2	70.6	71.4	73.3	74.7	74.7	74.7	74.9	76.3
ATV58HD64N4•	45	60	93.5	84.3	84.8	88.8	89.7	92.3	89.7	92.3	93.8
ATV58HD79N4•	55	75	115.5	102.7	103.3	106.4	108.6	111.6	108.6	112.1	112.7
ATV58HC13N4X	75	100	132	—	—	—	132	—	145	—	110
ATV58HC15N4X	90	125	176	—	—	—	159	—	176	—	138
ATV58HC19N4X	110	150	221	—	—	—	183	—	206	—	167
ATV58HC23N4X	132	200	264	—	—	—	—	—	268	—	222
ATV58HC25N4X	160	250	303	—	—	—	—	—	324	—	275
ATV58HC31N4X	200	300	378	—	—	—	—	—	376	—	331
ATV58HC33N4X	220	350	432	—	—	—	—	—	425	—	386

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Table 27: Three-Phase Input Line Currents, Constant Torque Low Noise, 400/460 V Ratings, Switching Frequency: ATV58HD28N4–D46N4 @ 8 kHz, ATV58HD54N4–D79N4 @ 4 kHz

NOTE: The input conductor ampacity rating should not be less than the ampacity rating selected based on the rated controller output current.

Drive Controller Catalog Number	Motor Power		Output Current	Input Line Current							
				5000 AIC		10000 AIC		22000 AIC		w/ Additional 3% Line Impedance 22000 AIC	
	400 V kW	460 V hp	A	400 V A	460 V A	400 V A	460 V A	400 V A	460 V A	400 V A	460 V A
ATV58HD28N4•	15	20	33	31.7	32.4	32.4	33.1	33.1	33.7	33.0	33.6
ATV58HD33N4•	18.5	25	40.7	37.9	39.3	39.4	40.1	40.4	40.7	40.3	41.0
ATV58HD46N4•	22	30	48.4	46.3	47.0	48.2	48.7	49.0	49.8	49.1	49.4
ATV58HD54N4•	30	40	66	60.9	60.4	63.2	63.0	64.4	65.4	64.7	64.8
ATV58HD64N4•	37	50	79.2	73.0	74.3	77.9	78.8	80.2	82.1	81.0	81.7
ATV58HD79N4•	45	60	93.5	65.3	65.8	90.6	91.7	94.6	95.0	94.4	94.9

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Table 28: Three-Phase Input Line Currents, Variable Torque, 400/460 V Ratings, Switching Frequency: ATV58HU18N4–D23N4 @ 8 kHz, ATV58HD28N4–D46N4 @ 4kHz, ATV58HD54N4–C33N4X @ 2 kHz

NOTE: The input conductor ampacity rating should not be less than the ampacity rating selected based on the rated controller output current.

Drive Controller Catalog Number	Motor Power		Output Current	Input Line Current							
				5000 AIC		10000 AIC		22000 AIC		w/ Additional 3% Line Impedance 22000 AIC	
	400 V kW	460 V hp	A	400 V A	460 V A	400 V A	460 V A	400 V A	460 V A	400 V A	460 V A
ATV58HU18N4•	0.75	1	2.1	3.2	2.8	—	—	—	—	1.9	1.6
ATV58HU29N4•	1.5	2	3.4	5.5	4.8	—	—	—	—	3.3	3.0
ATV58HU41N4•	2.2	3	4.8	7.4	6.5	—	—	—	—	4.8	4.2
ATV58HU54N4•	3	4	6.2	10.2	7.8	—	—	—	—	6.3	5.6
ATV58HU72N4•	4	5	7.6	12.2	10.7	—	—	—	—	8.6	7.2
ATV58HU90N4	5.5	7.5	11	16.3	14.3	—	—	—	—	11.8	10.1
ATV58HD12N4•	7.5	10	14	20.7	18.2	22.7	19.9	26.5	21	16.0	13.2
ATV58HD16N4•	11	15	21	28.8	25.3	31.4	27.6	35.4	28	23.6	19.5
ATV58HD23N4•	15	20	27	36.5	32	39.6	34.7	44.7	35.6	30.6	25.8
ATV58HD28N4• [1]	18.5	25	34	36.3	32.7	36.9	33.4	37.4	34.1	37.6	34.0
ATV58HD28N4•	22	30	40	42.3	38.1	43.0	38.7	43.9	39.8	43.6	39.6
ATV58HD33N4•	30	40	52	55.5	49.3	56.3	51.1	57.1	51.6	56.8	51.4
ATV58HD46N4•	37	50	65	68.9	61.8	70.9	63.5	72.3	65.4	72.0	65.1
ATV58HD54N4•	45	60	77	82.7	72.3	84.1	75.2	85.5	77.7	85.5	77.5
ATV58HD64N4•	55	75	96	103.7	91.0	107.0	96.3	111.1	100.8	111.1	100.0
ATV58HD79N4•	75	100	124	133.6	117.4	138.0	122.6	142.9	129.3	142.4	128.8
ATV58HC10N4X	90	125	156	—	—	129	161	144	180	159	176
ATV58HC13N4X	110	150	180	—	—	147	184	165	206	182	202
ATV58HC15N4X	132	200	240	—	—	185	232	212	265	234	260
ATV58HC19N4X	160	250	302	—	—	—	—	260	325	288	320
ATV58HC23N4X	200	300	361	—	—	—	—	300	373	329	366
ATV58HC25N4X	220	350	414	—	—	—	—	337	422	372	413
ATV58HC28N4X	250	400	477	—	—	—	—	375	468	414	460
ATV58HC31N4X	280	450	515	—	—	—	—	415	519	458	508
ATV58HC33N4X	315	500	590	—	—	—	—	455	569	502	557

[1] The ATV58HD28N4 is rated for 8 kHz operation at 25 hp.

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Table 29: Three-Phase Input Line Currents, Variable Torque Low Noise, 400/460 V Ratings, Switching Frequency: ATV58HU18N4–D46N4 @ 8 kHz, ATV58HD54N4–D79N4 @ 4 kHz

NOTE: The input conductor ampacity rating should not be less than the ampacity rating selected based on the rated controller output current.

Drive Controller Catalog Number	Motor Power		Output Current	Input Line Current							
				5000 AIC		10000 AIC		22000 AIC		w/ Additional 3% Line Impedance 22000 AIC	
	400 V kW	460 V Hp	A	400 V A	460 V A	400 V A	460 V A	400 V A	460 V A	400 V A	460 V A
ATV58HU18N4•	0.75	1	2.1	3.2	2.8	—	—	—	—	1.9	1.6
ATV58HU29N4•	1.5	2	3.4	5.5	4.8	—	—	—	—	3.3	3.0
ATV58HU41N4•	2.2	3	4.8	7.4	6.5	—	—	—	—	4.8	4.2
ATV58HU54N4X•	[1]	5	7.6	—	10.0	—	—	—	—	—	7.5
ATV58HU72N4X•	[1]	7.5	11	—	14.3	—	—	—	—	—	9.9
ATV58HU90N4X•	[1]	10	14	—	18.1	—	—	—	—	—	13.1
ATV58HD12N4X•	[1]	15	21	—	25.8	—	—	—	—	—	19.6
ATV58HD16N4X•	[1]	20	27	—	32.4	—	—	—	—	—	25.9
ATV58HD23N4X•	[1]	25	34	—	38.9	—	—	—	—	—	31.1
ATV58HD28N4•	18.5	25	34	36.3	32.7	36.9	33.4	37.4	34.1	37.6	34.0
ATV58HD33N4•	22	30	40	43.3	39.0	44.2	40.1	45.1	40.4	44.7	40.4
ATV58HD46N4•	30	40	52	56.9	51.0	58.5	52.8	60.3	54.5	60.2	54.3
ATV58HD54N4•	37	50	65	70.2	61.5	71.9	64.9	73.6	67.0	73.4	67.0
ATV58HD64N4•	45	60	77	84.0	74.4	88.8	79.8	91.8	82.8	91.8	82.5
ATV58HD79N4•	55	75	96	102.8	91.7	106.9	96.4	112.6	100.5	112.3	100.0

[1] This product is for 460 Vac applications at 5000 AIC. A line reactor (3% minimum) must be used at higher AIC ratings. See Table 28 for 400 Vac rated controllers in this hp range.

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Output Wiring Precautions

⚠ WARNING

IMPROPER WIRING CAN DAMAGE EQUIPMENT

The drive controller will be damaged if input line voltage is applied to output terminals (U, V, W). Check the power connections before energizing the drive controller.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

The drive controller is sensitive to the amount of capacitance (either phase-to-phase or phase-to-ground) present on the output power conductors. If excessive capacitance is present, the drive controller may trip on overcurrent. Follow the guidelines below when selecting output cable:

- Cable type: select cable with a low capacitance phase-to-phase and to phase-to-ground. Do not use mineral-impregnated cable because it has a very high capacitance. Immersion of cables in water increases capacitance.
- Cable length: the longer the cable, the greater the capacitance. Cable lengths greater than 100 ft (30.5 m) may cause ground faults. For installation where cable capacitances may be a problem, installing a reactor between the drive controller and the motor will increase inductance and decrease the effect of capacitance between cable conductors.
- Proximity to other output cables: because of high frequency switching and increased capacitance, the drive controller may fault under some conditions.
- **Do not use lightning arrestors or power factor correction capacitors on the output of the drive controller.**

Wiring needs a minimum inductance to protect the drive controller output from short circuits. Provide at least 20 in. (500 mm) of cable at the drive controller output (U, V, W).

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⚠ CAUTION

INSUFFICIENT OUTPUT INDUCTANCE

For proper drive controller short circuit protection, certain values of inductance may be required in the output power wiring. Inductance can be supplied by the power wiring or auxiliary inductors.

Failure to follow this instruction can result in injury or equipment damage.

Grounding

For safe, dependable operation, ground the drive controller according to the National Electrical Code and all local codes. To ground the drive controller:

- Connect a copper wire from the ground terminal on the drive controller (see Figures 11–18 on pages 34–41) to the power system ground conductor. Wire size is determined by the drive controller size and by national and local codes.
- Verify that the resistance to ground is 1 Wor less. Improper grounding causes intermittent and unreliable operation.

⚠ DANGER

HAZARDOUS VOLTAGE

Ground the equipment using the provided ground connecting point as shown in Figures 11–18 on pages 34–41. The drive controller panel must be properly grounded before power is applied.

Do not use metallic conduit as a ground conductor.

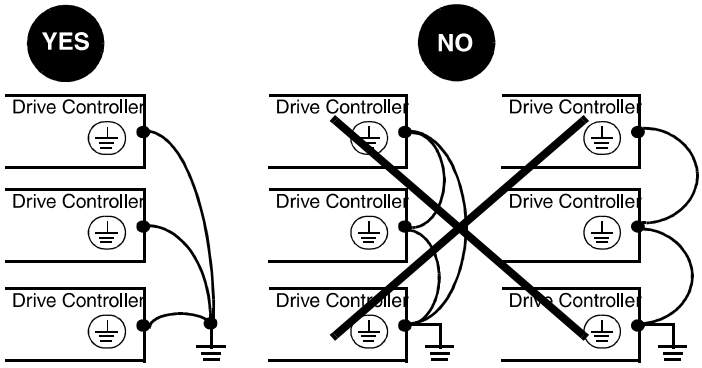
Electric shock will result in death or serious injury.

Ground multiple drive controllers as shown in Figure 20 on page 58. Use one grounding conductor per device. Do not loop ground conductors or install them in series.

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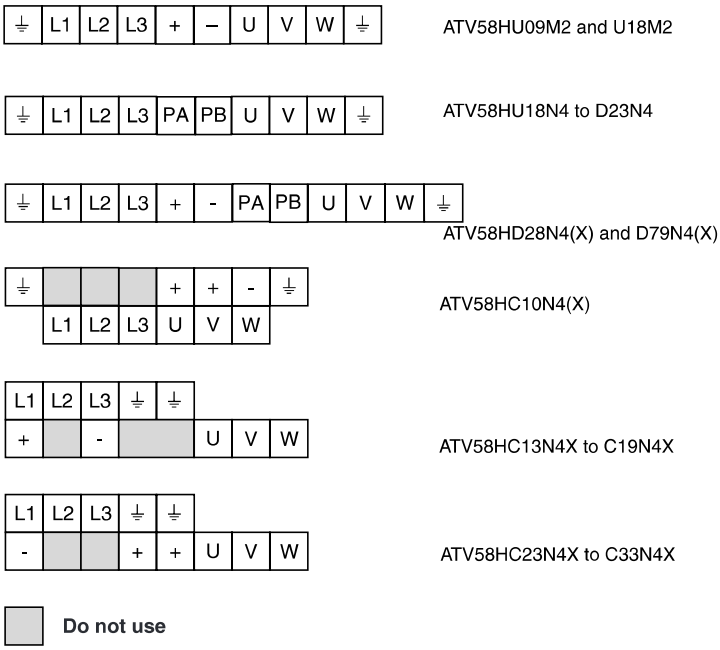
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Figure 20: Grounding Multiple Drive Controllers



Power Terminals

Figure 21: Power Terminal Layout



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Table 30: Power Terminal Functions

Terminal	Function	For ATV58H•••••
⏚	Ground terminal	All models
L1 L2	Input power	All models
L3		All models except U09M2 and U18M2
+ -	Connection for external dynamic braking module or DC bus inter-tie	U09M2 and U18M2, D16M2 to D46M2, D28N4 to C33N4
PA PB	Connection for dynamic braking resistor	All models except U09M2, U18M2, and C10N4 to C33N4
U V W	Output connections to motor	All models
⏚	Ground terminal	All models

Table 31: Power Terminal Wire Size and Torque

Drive Controller ATV58H•••••	Maximum Wire Size [1] AWG (mm^2)	Torque lb-in (N•m)
U09M2, U18M2	14 (1.5)	5.0 (0.56)
U29M2, U41M2, U18N4, U29N4, U41N4	8 (6)	7.5 (0.85)
U54M2, U72M2, U54N4, U72N4, U90N4	8 (6)	7.5 (0.85)
U90M2, D12M2, D12N4, D16N4, D23N4	6 (10)	20 (2.26)
D16M2, D23M2, D28N4, D33N4, D46N4	2/0 (50)	88 (10)
D28M2, D33M2, D46M2, D54N4, D64N4, D79N4	4/0 (95)	170 (19)

[1] 75 °C copper.

- Power terminal lugs are shipped with drive controllers ATV58HC10N4X to ATV58HC19N4X.
- Supply crimp style lugs to fit the selected wire size for drive controllers ATV58HC23N4X to ATV58HC33N4X.
- See Figure 22 on page 60 for power terminal lug installation.

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To install the power terminal lugs:

⚠ DANGER

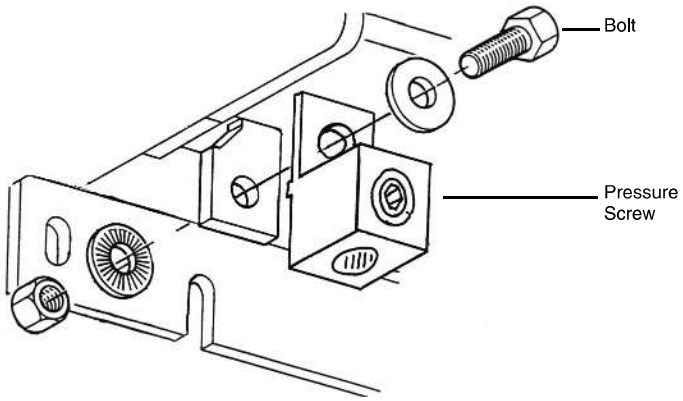
HAZARDOUS VOLTAGE

Turn off all power supplying this equipment before working on or inside the equipment.

Failure to follow this instruction will result in death or serious injury.

1. Using the hardware provided, attach the lugs as shown in Figure 22. Note the orientation of the washers.

Figure 22: Lug and Washer Orientation



2. Torque the bolts to the values listed in Table 32 on page 61.
3. Insert the power wires into the lugs and tighten the pressure screws. See the pressure screw torque requirements in Table 32.
4. Check for proper electrical clearances. For applications up to 600 V, maintain at least 0.375 in. (9.5 mm) clearance between adjacent power terminal lugs, and at least 0.5 in. (12.7 mm) clearance between any live part and the device enclosure.

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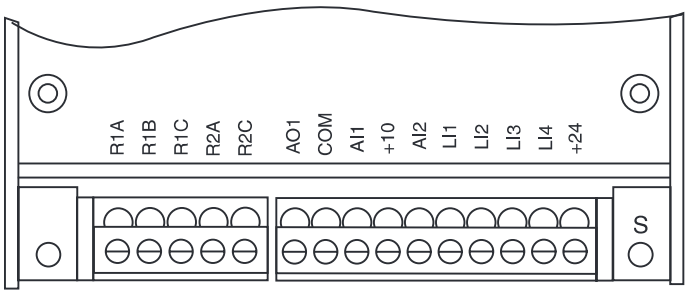
Table 32: Lug and Pressure Screw Torque Values

Drive Controller	Bolt Torque		Wire Range	Pressure Screw Torque	
	lb-in	N•m	MCM	lb-in	N•m
ATV58HC10N4X–C19N4X (6 power lugs and 2 ground lugs are supplied with these drive controllers)	310	35	4 to 500	375	42
ATV58HC23N4X–C33N4X	310	35	Supply crimp style lugs to fit the selected wire size.		

Control Terminals

The control terminal strip contains two pull-apart terminal blocks, one for the relay outputs and one for the low level inputs and outputs. The S terminal is used for the shield connection. Maximum wire size for all control terminals is 14 AWG (1.5 mm^2). The tightening torque is 3.5 lb-in (0.4 N•m). Figure 23 shows the location of the control terminals.

Figure 23: Location of Control Terminals



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Table 33: Control Terminal Characteristics

Terminal	Function	Characteristics
S	Shield connection	
R1A R1B R1C	R1A to R1C is a normally-open (N.O.) contact. When the drive controller is powered with no fault, the contact is closed. R1B to R1C is a normally-closed (N.C.) contact. When the drive controller is powered with no fault, the contact is open.	Minimum: 10 mA, 24 Vdc Maximum: inductive load of 1.5 A for 250 Vac and 30 Vdc Maximum resistive load: 5 A for 250 Vac or 30 Vdc
R2A R2C	N.O. programmable relay R2	
COM	Common for logic and analog inputs	
AO1	Analog current output X–Y mA analog output, with X and Y programmable from 0–20 mA. Factory setting: 0–20 mA	Maximum load impedance = 500 W Resolution: 0.04 mA (9 bits) Linearity: ± 0.1 mA Accuracy: ± 0.2 mA The analog output is updated every 2 ms, maximum
AI1	Analog input 1 (voltage) Used for speed reference input	0 to 10 Vdc, Impedance = 30 kW Frequency resolution analog reference: high speed / 1024 Hz (10 bit). Accuracy ±1%, linearity ±0.5% of the maximum output frequency Sampling time: 5 ms
+10	Supply for reference potentiometer (1 to 10 kW potentiometer)	10 V ± 1%, protected against short circuits and overloads 10 mA maximum
AI2	Analog input 2 (current) Used for speed reference input or feedback, depending on configuration.	X to Y mA, with X and Y programmable from 0 to 20 mA; Factory setting: 0 to 20 mA Impedance = 100 W Frequency resolution analog reference: high speed / 1024 Hz (10 bit). Accuracy ±1%, linearity ±0.5% of the maximum output frequency Sampling time: 5 ms

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Table 33: Control Terminal Characteristics *(cont.)*

Terminal	Function	Characteristics
LI1 LI2 LI3 LI4	Logic inputs. Function depends on configuration. See Table 42 on page 81 for factory settings.	Supplied by +24 Vdc State 0 if < 5 V, state 1 if > 11 V Vmax = 30 V Impedance = 3.5 kW Sampling time: 5 ms
+24	Power supply for logic inputs	+24 V protected against short circuits and overloads Minimum 20 V, maximum 30 V 200 mA maximum

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

LI1 has priority:

- If LI1 is closed while LI2 is active, the controller will respond to LI1.
- If the LI1 input is lost while LI2 is active, the controller will respond to LI2 and reverse directions.

The logic inputs must be programmed appropriately for the application to prevent the motor from spinning in an unintended direction.

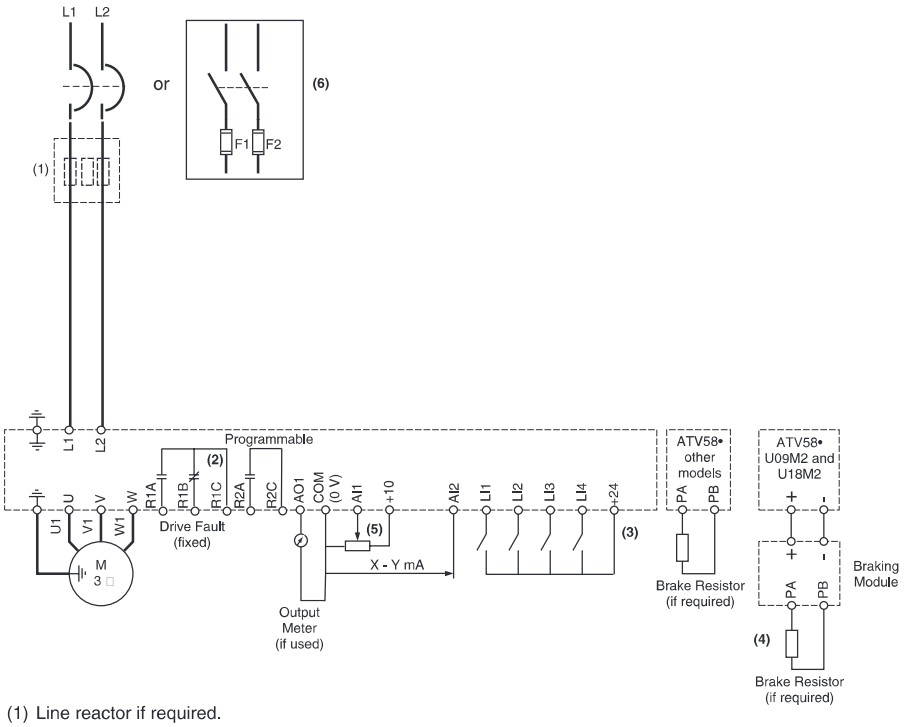
Failure to follow this instruction can result in death or serious injury.

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Wiring Diagrams

Figure 24: Single-Phase Wiring Diagram

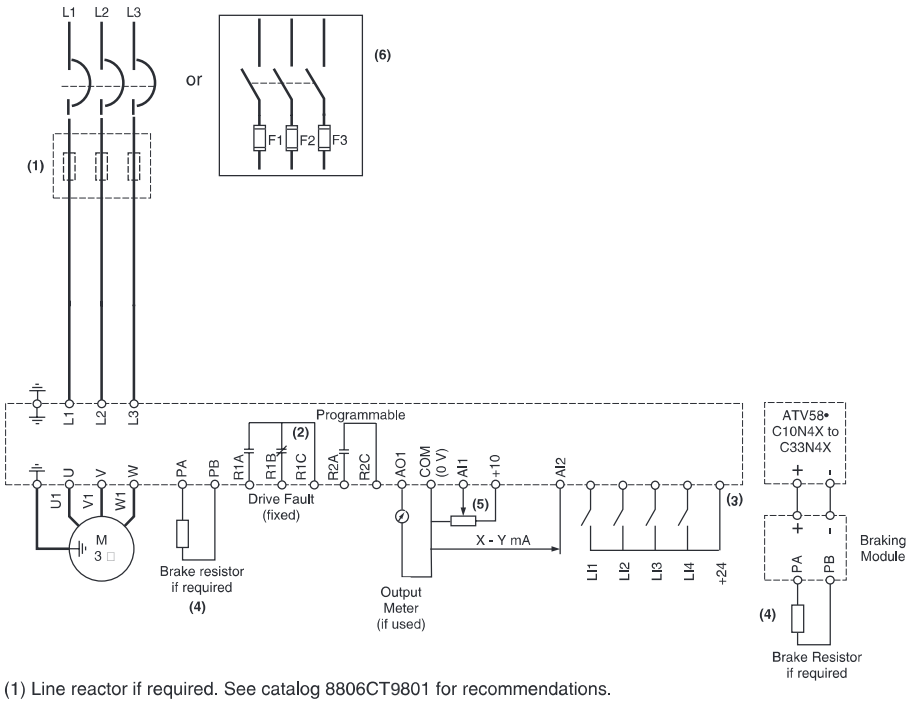


(1) Line reactor if required.
(2) Fault relay contacts for remote signaling of the drive controller state.
Contact state shown with drive controller deenergized or faulted.
(3) Internal +24 V. When using +24 V external supply, connect the 0 V terminal to the COM terminal.
Do not use the +24 V terminal on the control board, but connect logic inputs to external +24 V.
(4) When using dynamic braking on drive controllers ATV58HU09M2 and U18M2, the dynamic braking module, catalog number VW3A58701, must be used. See Appendix A for available braking resistor kits.
(5) Manual speed potentiometer (1–10 k□).
(6) Branch circuit protection (circuit breaker or fuses) must be installed.

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Figure 25: Three-Phase Wiring Diagram



(1) Line reactor if required. See catalog 8806CT9801 for recommendations.
(2) Fault relay contacts for remote signalling of the drive controller state.
Contact state shown with drive controller deenergized or faulted.
(3) Internal +24 V. When using +24 V external supply, connect the 0 V terminal to the COM terminal.
Do not use the +24 terminal on the control board, but connect logic inputs to external +24 V.
(4) See Appendix A for available braking resistor kits.
(5) Manual speed potentiometer (1–10 k□).
(6) Branch circuit protection (circuit breaker or fuses) must be installed.

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Recommended Branch Circuit Protection Devices

Branch circuit protection must be installed on the input (line side) of the drive controllers. Input fuses or circuit breakers may be used on 1/2 to 500 hp drive controllers.

Fuses

The fuses specified in Tables 34–36 (pages 67–69) are suitable for branch short circuit protection and provide excellent short circuit protection for the drive.

Circuit Breakers

The circuit breakers specified in Tables 37–39 (pages 71–74) are suitable for branch short circuit protection and provide short circuit protection for the drive.

⚠ DANGER

RISK OF EXPLOSION OR ARC FLASH

When using a circuit breaker with this drive controller:

- Use an enclosure sized to meet or exceed the minimum volume requirements shown in Tables 37 to 39 on pages 71 to 74.
- Select an enclosure designed to withstand the interruption pressures associated with a short circuit.

Failure to follow these instructions will result in death, serious injury, or equipment damage.

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Table 34: Recommended Fuses: 208/230 V

Single-phase

Motor Power		Drive Controller	F1-F2 Line Power Fuses
hp	kW	ATV58H•••••	Class J
0.5	0.37	U09M2	10 [1]
1	0.75	U18M2	15 [1]
2	1.5	U29M2	30 [1]
3	2.2	U41M2	30 [1]
4	3	U72M2	35 [1]
5	4	U90M2	60 [1]
7.5	5.5	D12M2	70 [1]
10	7.5	D16M2	90 [2]
15	11	D23M2	125 [2]
20	15	D28M2	150 [2]
25	18.5	D33M2	175 [2]
30	22	D46M2	200 [2]

[1] Fast-acting or time-delay Class J fuses are acceptable. Class T fuses are also acceptable. Class CC fuses may be used if the recommended fuse rating is 30 A or lower.

[2] Fast-acting Class J fuses only. Class T fuses are also acceptable.

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Legend

CT	Constant Torque	**VTLN**	Variable Torque Low Noise
CTLN	Constant Torque Low Noise	**VT**	Variable Torque

Table 35: Recommended Fuses: 208/230 V

Three-phase

Motor Power		Drive Controller ATV58H••••• CT, VT, VTLN	F1-F2-F3 Line Power Fuses Class J [1]
hp	**kW**		
2	1.5	U29M2	15
3	2.2	U41M2	20
—	3	U54M2	30
5	4	U72M2	35
7.5	5.5	U90M2	60
10	7.5	D12M2	70

hp	kW	CTLN	Class J [2]
10	7.5	D16M2	70
15	11	D23M2	90
20	15	D28M2	110
25	18.5	D33M2	125
30	22	D46M2	175

hp	kW	CT, VTLN	Class J [2]
15	11	D16M2	70
20	15	D23M2	90
25	18.5	D28M2	110
30	22	D33M2	125
40	30	D46M2	175

hp	kW	VT	Class J [2]
15	11	D16M2	70
20	15	D16M2	90
25	18.5	D23M2	125
30	22	D28M2	150
40	30	D33M2	175
50	37	D46M2	200

[1] Fast-acting or time-delay Class J fuses. Class T fuses are also acceptable. Class CC fuses may be used if recommended fuse rating is 30 A or lower.

[2] Fast-acting Class J fuses only. Class T fuses are also acceptable.

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Legend

CT	Constant Torque	**VTLN**	Variable Torque Low Noise
CTLN	Constant Torque Low Noise	**VT**	Variable Torque

Table 36: Recommended Fuses: 400/460 V

Three-phase

Motor Power		Drive Controller ATV58H•••••	F1-F2-F3 Line Power Fuses
hp	**kW**	**CT, VT, VTLN**	**Class J [1]**
1	0.75	U18N4	5
2	1.5	U29N4	10
3	2.2	U41N4	12
—	3	U54N4	15
5	4	U72N4	20
7.5	5.5	U90N4	25
10	7.5	D12N4	40
15	11	D16N4	50
20	15	D23N4	70

hp	**kW**	**VTLN**	**Class J [1]**
5	4	U54N4X	20
7.5	5.5	U72N4X	25
10	7.5	U90N4X	40
15	11	D12N4X	50
20	15	D16N4X	70
25	18.5	D23N4X	70

hp	**kW**	**CTLN**	**Class J [2]**
20	15	D28N4	70
25	18.5	D33N4	80
30	22	D46N4	100
40	30	D54N4	125
50	37	D64N4	150
60	45	D79N4	200

1. Fast-acting or time-delay Class J fuses. Class T fuses are also acceptable. Class CC fuses may be used if recommended fuse rating is 30 A or lower.
2. Fast-acting Class J fuses only. Class T fuses are also acceptable.
3. Use the Bussmann part numbers provided or an equivalent.

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Table 36: Recommended Fuses: 400/460 V *(cont.)*

Three-phase

Motor Power		Drive Controller ATV58H•••••	F1-F2-F3 Line Power Fuses
hp	**kW**	**CT, VTLN**	**Class J [2]**
25	18.5	D28N4	70
30	22	D33N4	80
40	30	D46N4	100
50	37	D54N4	125
60	45	D64N4	150
75	55	D79N4	175

hp	kW	VT	Class J [2]
25	18.5	D28N4	70
30	22	D28N4	90
40	30	D33N4	110
50	37	D46N4	150
60	45	D54N4	175
75	55	D64N4	200
100	75	D79N4	200

hp	kW	VT	Bussmann [3]
125	90	C10N4X	FWH-300A
150	110	C13N4X	FWH-400A
200	132	C15N4X	FWH-500A
250	160	C19N4X	FWH-600A
300	200	C23N4X	FWH-700A
350	220	C25N4X	FWH-800A
400	250	C28N4X	FWH-900A
450	280	C31N4X	FWH-900A
500	315	C33N4X	FWH-1000A

hp	kW	CT	Bussmann [3]
100	75	C13N4X	200 [2]
125	90	C15N4X	FWH-300A
150	110	C19N4X	FWH-400A
200	132	C23N4X	FWH-500A
250	160	C25N4X	FWH-600A

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Table 36: Recommended Fuses: 400/460 V *(cont.)*

Motor Power		Drive Controller ATV58H•••••	F1-F2-F3 Line Power Fuses
300	200	C31N4X	FWH-700A
350	220	C33N4X	FWH-800A

1 Fast-acting or time-delay Class J fuses. Class T fuses are also acceptable. Class CC fuses may be used if recommended fuse rating is 30 A or lower.

2 Fast-acting Class J fuses only. Class T fuses are also acceptable.

3 Use the Bussmann part numbers provided or an equivalent.

Table 37: Recommended Circuit Breakers: 208/230 V

Single-phase

Motor Power		Drive Controller ATV58H•••••	Continuous Rating	Square D Breaker or Equivalent	Minimum Enclosure Volume[1]
hp	kW		A		in^3
0.5	0.37	U09M2	15	FAL22015	3920
1	0.75	U18M2	15	FAL22015	3920
2	1.5	U29M2	30	FAL22030	3920
3	2.2	U41M2	30	FAL22030	3920
4	3	U72M2	35	FAL22035	3920
5	4	U90M2	60	FAL22060	6370
7.5	5.5	D12M2	70	FAL22070	6370
10	7.5	D16M2	90	FAL22090	7910
15	11	D23M2	125	KAL26125	7910
20	15	D28M2	150	KAL26150	12900
25	18.5	D33M2	175	KAL26175	12900
30	22	D46M2	200	KAL26200	12900

1 Minimum enclosure volume (cubic inches) for circuit breakers and drive controllers supplied from a circuit capable of delivering not more than 22,000 rms symmetrical amperes.

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Legend

CT	Constant Torque	**VTLN**	Variable Torque Low Noise
CTLN	Constant Torque Low Noise	**VT**	Variable Torque

Table 38: Recommended Circuit Breakers: 208/230 V

Three-phase

Motor Power		Drive Controller ATV58H•••••	Continuous Rating	Square D or Equivalent	Minimum Enclosure Volume[1]
hp	**kW**	**CT, VT, VTLN**	**A**	**Circuit Breaker**	**in³**
2	1.5	U29M2	15	FAL36015	3920
3	2.2	U41M2	20	FAL36020	3920
—	3	U54M2	30	FAL36030	3920
5	4	U72M2	35	FAL36035	3920
7.5	5.5	U90M2	60	FAL36060	6370
10	7.5	D12M2	70	FAL36070	6370
hp	**kW**	**CTLN**	**A**	**Circuit Breaker**	**in³**
10	7.5	D16M2	70	FAL36070	7910
15	11	D23M2	90	FAL36090	7910
20	15	D28M2	110	KAL36110	12900
25	18.5	D33M2	125	KAL36125	12900
30	22	D46M2	175	KAL36175	12900
hp	**kW**	**CT, VTLN**	**A**	**Circuit Breaker**	**in³**
15	11	D16M2	70	FAL36070	7910
20	15	D23M2	90	FAL36090	7910
25	18.5	D28M2	110	KAL36110	12900
30	22	D33M2	125	KAL36125	12900
40	30	D46M2	175	KAL36175	12900

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Table 38: Recommended Circuit Breakers: 208/230 V *(cont.)*

Motor Power		Drive Controller ATV58H•••••	Continuous Rating	Square D or Equivalent	Minimum Enclosure Volume[1]
hp	kW	VT	A	Circuit Breaker	in^3
15	11	D16M2	70	FAL36070	7910
20	15	D16M2	90	FAL36090	7910
25	18.5	D23M2	110	KAL36110	7910
30	22	D28M2	125	KAL36125	12900
40	30	D33M2	175	KAL36175	12900
50	37	D46M2	200	KAL36200	12900

[1] Minimum enclosure volume (cubic inches) for circuit breakers and drive controllers supplied from a circuit capable of delivering not more than 22,000 rms symmetrical amperes.

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Legend

CT	Constant Torque	**VTLN**	Variable Torque Low Noise
CTLN	Constant Torque Low Noise	**VT**	Variable Torque

Table 39: Recommended Circuit Breakers: 400/460 V

Three-phase

Motor		Drive Controller ATV58H•••••	Continuous Rating	Square D or Equivalent	Minimum Enclosure Volume[1]
hp	**kW**	**CT, VT, VTLN**	**A**	**Circuit Breaker**	**in³**
1	0.75	U18N4	15	FAL36015	3920
2	1.5	U29N4	15	FAL36015	3920
3	2.2	U41N4	15	FAL36015	3920
—	3	U54N4	15	FAL36015	3920
5	4	U72N4	20	FAL36020	3920
7.5	5.5	U90N4	25	FAL36025	3920
10	7.5	D12N4	40	FAL36040	6370
15	11	D16N4	50	FHL36050	6370
20	15	D23N4	70	FHL36070	6370
hp	**kW**	**VTLN**	**A**	**Circuit Breaker**	**in³**
5	4	U54N4X	20	FAL36020	3920
7.5	5.5	U72N4X	25	FAL36025	3920
10	7.5	U90N4X	40	FHL36040	6370
15	11	D12N4X	50	FHL36050	6370
20	15	D16N4X	70	FHL36070	6370
25	18.5	D23N4X	70	FHL36070	6370
hp	**kW**	**CTLN**	**A**	**Circuit Breaker**	**in³**
20	15	D28N4	70	FHL36070	7910
25	18.5	D33N4	80	FHL36080	7910
30	22	D46N4	100	FHL36100	7910
40	30	D54N4	125	KAL36125	12900
50	37	D64N4	150	KAL36150	12900
60	45	D79N4	200	KAL36200	12900

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Table 39: Recommended Circuit Breakers: 400/460 V *(cont.)*

Three-phase

Motor		Drive Controller ATV58H•••••	Continuous Rating	Square D or Equivalent	Minimum Enclosure Volume[1]
hp	kW	CT, VTLN	A	Circuit Breaker	in^3
25	18.5	D28N4	70	FHL36070	7910
30	22	D33N4	80	FHL36080	7910
40	30	D46N4	100	FHL36100	7910
50	37	D54N4	125	KAL36125	12900
60	45	D64N4	150	KAL36150	12900
75	55	D79N4	175	KAL36175	12900
hp	kW	VT	A	Circuit Breaker	in^3
25	18.5	D28N4	70	FHL36070	7910
30	22	D28N4	90	FHL36090	7910
40	30	D33N4	110	KAL36110	7910
50	37	D46N4	150	KAL36150	7910
60	45	D54N4	175	KAL36175	12900
75	55	D64N4	200	KAL36200	12900
100	75	D79N4	200	KAL36200	12900
125	90	C10N4X	250	KAL36250	45000
150	110	C13N4X	400	LAL36400	54000
200	132	C15N4X	400	LAL36400	54000
250	160	C19N4X	400	LAL36400	54000
300	200	C23N4X	600	MAL36600	63000
350	220	C25N4X	600	MAL36600	63000
400	250	C28N4X	600	MAL36600	63000
450	280	C31N4X	800	MAL36800	63000
500	315	C33N4X	800	MAL36800	63000

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Table 39: Recommended Circuit Breakers: 400/460 V *(cont.)*

Motor		Drive Controller ATV58H•••••	Continuous Rating	Square D or Equivalent	Minimum Enclosure Volume[1]
hp	kW	CT	A	Circuit Breaker	in^3
100	75	C13N4X	250	KAL36250	54000
125	90	C15N4X	250	KAL36250	54000
150	110	C19N4X	400	LAL36400	54000
200	132	C23N4X	400	LAL36400	63000
250	160	C25N4X	400	LAL36400	63000
300	200	C31N4X	600	MAL36600	63000
350	220	C33N4X	600	MAL36600	63000

[1] Minimum enclosure volume (cubic inches) for circuit breakers and drive controllers supplied from a circuit capable of delivering not more than 22,000 rms symmetrical amperes.

USING DYNAMIC BRAKING

Consult Table 40 for minimum ohmic values when selecting dynamic braking resistors.

NOTE: Drive controllers ATV58HC10N4X–HC33N4X do not have an integrated dynamic braking transistor. Consult your local Schneider Electric representative for dynamic braking options for these units.

Table 40: Minimum Ohmic Value of Dynamic Braking Resistors

ATV58•••••	U09M2 U18M2	U29M2 U41M2	U54M2	U72M2	U90M2 D12M2	D16M2X	D23M2X	D28M2X	D33M2X	D46M2X
Min. Resistance W	75	38	31	25	13	8	8	4	2.67	2.67

ATV58•••••	U18N4 U29N4 U41N4 U54N4	U72N4	U90N4	D12N4	D16N4 D23N4	D28N4, D28N4X D33N4, D33N4X D46N4, D46N4X‘	D54N4, D54N4X	D64N4, D64N4X D79N4, D79N4X
Min. Resistance W	85	57	47	53	19	14	8	5

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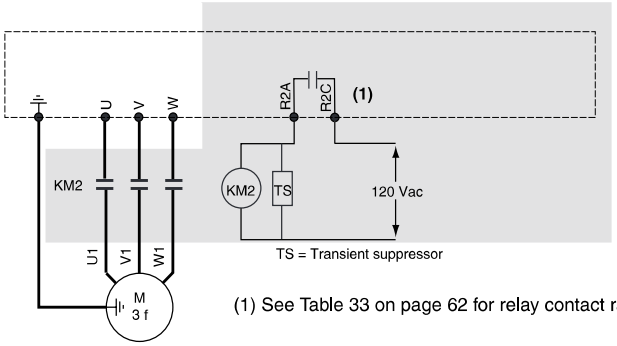
USING A LINE CONTACTOR

When controlling the power with an isolation line contactor, avoid frequently opening and closing the line contactor as this could cause premature failure of the drive controller. Use inputs LI1 to LI4 to start and stop the drive controller. Limit operations of the line contactor to less than once per minute.

Output Contactor Wiring Diagram

Relay R2 can be configured for the Output Contactor Command function. Refer to the keypad display instruction bulletin, VVDED397047US, for more information on this function. If you are using output contactor command, add the shaded portion of the output contactor wiring diagram (Figure 26 on page 77) to either the single-phase input wiring diagram (Figure 24 on page 64) or the three-phase input wiring diagram (Figure 25 on page 65).

Figure 26: Output Contactor Wiring Diagram



(1) See Table 33 on page 62 for relay contact ratings.

NOTE: Use transient suppression on all inductive devices (such as relays, contactors, and solenoids) near the drive controller or connected on the same circuit.

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Table 41: Recommended Output Contactors[1]

ATV58H•••••	KM2 LC1- [2]	ATV58H•••••	KM2 LC1- [2]
U09M2	D25	U29N4	D25
U18M2	D25	U41N4	D25
U29M2	D25	U72N4	D20
U41M2	D25	U90N4	D25
U72M2	D25	D12N4	D25
U90M2	D25	D16N4	D25
D12M2	D32	D23N4	D40
D16M2	D40	D28N4	D40
D23M2	D80	D33N4	D50
D28M2	D80	D46N4	D80
D33M2	D80	D54N4	D80
D46M2	F115	D64N4	F115
U18N4	D25	D79N4	F115

1 With 120 Vac coil voltage.

2 Refer to the *Digest* for other control voltages.

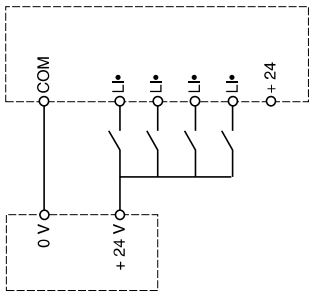
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EXTERNAL 24 V SUPPLY

If an external 24 V power supply is used for the logic inputs, the +24 terminal on the drive controller is not used. Figure 27 illustrates wiring when an external supply is used.

Figure 27: External Supply Wiring Diagram



FAULT RELAY

The fault relay is energized whenever the drive controller is powered and there is no fault. It provides a normally-open and a normally-closed contact.

To reset the drive controller after a fault, cycle the power, allowing the red LED to turn off.

AVAILABLE MOTOR TORQUE

Continuous duty:

- For self-ventilated motors, motor cooling depends on the speed.
- Continuous duty requires derating for speeds less than 50% of the nameplate motor speed.

Operation in overspeed:

- In overspeed operation, the voltage does not increase with the frequency, resulting in reduced induction in the motor and loss of torque. Consult the motor manufacturer to ensure that the motor can operate in overspeed.

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- For a special motor, the nominal frequency and the maximum frequency can be adjusted between 10 and 500 Hz using the keypad display or PowerSuite™ software. See the Appendix for a list of accessories.

⚠ CAUTION

MACHINERY OVERSPEED

Some motors and/or loads may not be suited for operation above the nameplate motor speed and frequency. Consult the motor manufacturer before operating the motor above the rated speed.

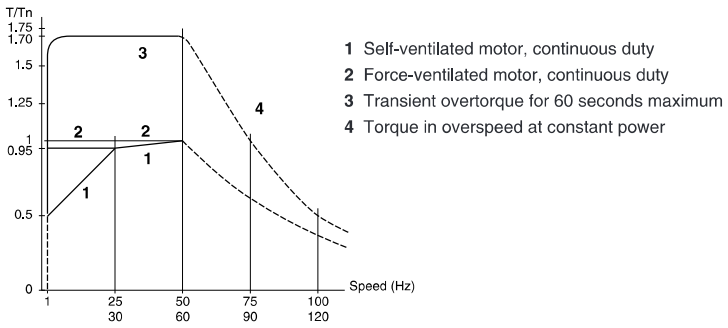
Failure to follow this instruction can result in injury or equipment damage.

The available overtorque depends on the motor design category. For typical NEMA Design B motors, the ATV58 *TRX* controller can deliver 200% of the nominal motor torque for 2 seconds, and 170% for 60 seconds.

The motor power rating must be at least 25% of drive controller rated power for the drive controller to properly operate the motor.

Figure 28 shows the typical torque characteristics of the ATV58 *TRX* drive controller.

Figure 28: Typical Torque Characteristics



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FACTORY SETTINGS

The ATV58 *TRX* drive controller is preset for constant torque applications. Table 42 lists the factory settings. See the Appendix on page 87 for available configuration tools to alter the factory settings.

Table 42: Factory Settings

Function	Setting
Base frequency	50/60 Hz [1]
Motor voltage	230 V or 400/460 V [1], depending on the model
Acceleration and deceleration ramps	3 s
Low speed	0 Hz
High speed	50/60 Hz [1]
Maximum frequency	60/72 Hz [1]
Motor thermal current	0.9 times rated drive controller output current
DC braking current at stop	0.63 times rated drive controller output current for 0.5 s
Operation	Constant torque Variable torque for ATV58HC10N4X–HC33N4X
Control type	2-wire control
Logic inputs	LI1: Run Forward; LI2: Run Reverse **LI3 LI4 Preset speed** 0 0 Low speed + reference 1 0 10 Hz 0 1 15 Hz 1 1 High speed ATV58HC10N4X to C33N4X: LI1: run forward; LI2 run reverse LI3: fault reset: LI4 not assigned
Analog inputs	AI1: 0 to +10 V speed reference AI2: 4 to 20 mA speed reference Analog inputs set for reference summing
Analog output	Motor frequency
Relay outputs	R1: fault relay (cannot be reassigned) R2: output contactor control (can be reassigned) ATV58HC10N4X to C33N4X: R2: Drive running
Switching frequency	4 kHz ATV58HC10N4X to C33N4X: 2 kHz

[1] Depending on the position of the 50/60 Hz switch. The switch is factory set to 60 Hz.

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START UP

⚠ DANGER

HAZARDOUS VOLTAGE

- Read and understand this bulletin in its entirety before installing or operating Altivar 58 *TRX* drive controllers.
- This equipment must only be installed, adjusted, repaired, and serviced by qualified personnel.
- The user is responsible for conforming to all applicable code requirements with respect to grounding all equipment.
- Many parts in this drive controller, including printed wiring boards, operate at line voltage. DO NOT TOUCH. Use only electrically insulated tools.
- DO NOT short across DC bus capacitors or touch unshielded components or terminal strip screw connections with voltage present.
- Before servicing the drive controller:
  - Disconnect all power including external control power that may be present before servicing the drive controller.
  - Place a “DO NOT TURN ON” label on the drive controller disconnect.
  - Lock the disconnect in the open position.
  - WAIT TEN MINUTES for the DC bus capacitors to discharge. Then follow the DC bus voltage measurement procedure on page 42 to verify that the DC voltage is less than 45 V. The drive controller LEDs are not accurate indicators of the absence of DC bus voltage.
- Install and close all covers before applying power, or starting and stopping the drive controller.

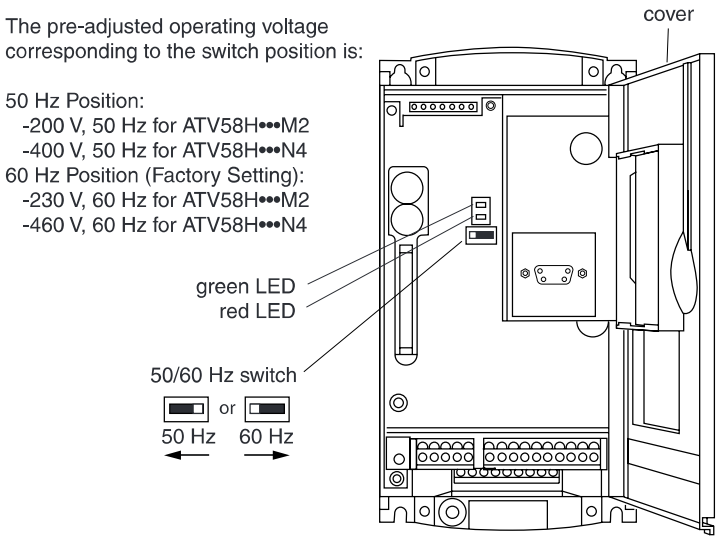
Electric shock will result in death or serious injury.

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Before powering up the drive controller, the 50/60 Hz switch must be set to correspond with the incoming power frequency. Unlock and open the cover to access the 50/60 Hz switch on the control board. Set the switch to the position corresponding to the mains frequency.

Figure 29: Setting the 50/60 Hz Switch



Several tools, ordered separately, are available to assist with starting up the ATV58 *TRX* drive controller:

- Keypad display, VW3A58101U.
- PowerSuite software, VW3A58104
- PC connection cable, VW3A8106
- Pocket PC connection kit, VW3A58111

Consult the documentation provided with each of these tools for startup and maintenance information.

If your ATV58 *TRX* controller has an I/O extension card or communication card, also consult the documentation provided with the card.

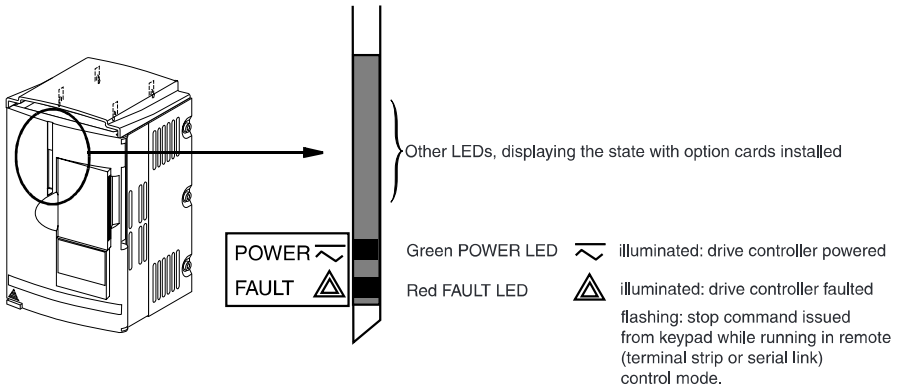
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LIGHT EMITTING DIODES (LEDs)

The LEDs on the front of the ATV58 *TRX* controller indicate several states as shown in Figure 30.

Figure 30: LED States



PREVENTIVE MAINTENANCE

Perform the following checks at regular intervals:

- Remove all power and perform the “Bus Voltage Measurement Procedure” on page 42, then check the condition and tightness of the connections.
- Make sure the ventilation is effective and that the temperature around the drive controller remains at an acceptable level.
- Remove dust and debris from the drive controller, if necessary.

TROUBLESHOOTING AND MAINTENANCE

When a fault is detected, the drive controller trips and the fault relay deenergizes.

After removing power and performing the “Bus Voltage Measurement Procedure” on page 42, check the supply voltage (Procedure 1 on page 85) and the peripheral components (Procedure 2 on page 86).

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If no problem is found with the supply voltage and peripheral equipment, install a keypad display for additional fault information. The fault codes are identified in the keypad display manual, VVDED397047US.

⚠ CAUTION

DIELECTRIC TESTS CAN DAMAGE EQUIPMENT

- Do not perform high potential dielectric tests on circuits while the circuits are connected to the drive controller.
- Disconnect any circuit requiring high potential dielectric tests from the drive controller before performing the test.

Failure to follow these instructions can result in injury or equipment damage.

Procedure 1: Checking the Supply Voltage

To determine if the voltage is within the drive controller tolerance:

1. Perform the bus voltage measurement procedure on page 42.
2. Attach meter leads to L1 and L2. Set the voltmeter to the 600 Vac scale.
3. Reapply power and check for the correct line voltage, shown on the drive controller nameplate rating.
4. Remove power and repeat the procedure for L2 and L3, and L1 and L3.
5. When all phases have been measured, remove the power. Remove the leads and replace all covers.

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Procedure 2: Checking the Peripheral Equipment

Check for the conditions described below, following the manufacturers' procedures:

1. A fuse may have blown or a circuit breaker may have tripped.
2. A switching device such as a contactor may not be closing at the correct time.
3. Conductors may require repair or replacement.
4. Connection cables to the motor or high resistance connections to ground may need to be checked. Follow NEMA standard procedure WC-53.
5. Motor insulation may need to be checked. Follow NEMA standard procedure MG-1. Do not apply high voltage to U, V, or W. Do not connect the high potential dielectric test equipment or insulation resistance tester to the drive controller since the test voltages used may damage the drive controller. Always disconnect the drive controller from the motor conductors while performing such tests.

Fault Reset

When a fault is detected, the drive controller trips and the fault relay opens. The first fault is saved and shown on the optional keypad display if power is maintained.

To reset the fault:

1. Remove power from the drive controller.
2. Before switching power back on, identify and correct the cause of the fault.
3. Restore power. This resets the fault if it has been corrected.

In certain cases, if automatic restart is enabled, the drive controller can be automatically restarted after the cause of the fault has been removed.

The PowerSuite software can be used to view the last eight faults recorded by the drive controller. See the Appendix on page 87 for ordering information.

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APPENDIX: ACCESSORIES AND REPAIR PARTS

Table 43 lists the accessories available for ATV58 *TRX* drive controllers. Table 44 on page 89 lists the available repair parts.

Accessories

Table 43: ATV58 *TRX* Accessories

Catalog No.	Description
VW3A8104	PowerSuite™ Software on a CD for use with Microsoft® Windows 95, 98, and NT™ PC operating systems and Windows CE v3.0 for Pocket PCs
VW3A8106	Cable and RS-232 to RS-485 adapter for connection of PC to an ATV58 controller
VW3A8111	Cable and RS-232 to RS-485 adapter for connection of a Pocket PC to an ATV58 controller
VW3A58101U	Keypad Display
VW3A58103	Remote Mounting Kit for Keypad (IP65 rated)
VW3A581131	Controller Inside the Programmable Option Card
VW3A58201U	Analog I/O Option Card
VW3A58202U	Digital I/O Option Card
VW3A58210U	Pump Switching Card
VW3A58211	Multi-motor Option Card
VW3A58212	Multi-parameter Option Card
VW3A58213	Simple-positioning Option Card
VW3A58253U	General Purpose Option Card
VW3A58301U	Fipio® Communication Card (PL7 Compatible)
VW3A58302U	Modbus® Plus Communication Card
VW3A58303U	Modbus/Unitelway™ Communication Card
VW3A58304EU	Interbus S Communication Card. Requires external power supply.
VW3A58306U	RS-485 Cable w/ Modbus Mapping Guide
VW3A58307U	Profibus DP Communication Card
VW3A58309U	DeviceNet™ Communication Card
VW3A58310U	Ethernet Modbus TCP/IP Communication Card
VW3A58311	Fipio Communication Card (Generic)
VW3A58312PU	Lonworks® to Modbus DIN Rail Mount Gateway
VW3A58354U	Johnson Controls® N2 Communication Card
VW3A58701	DB Transistor for ATV58HU09M2 and U18M2
VW3A58821	Fan Kit for ATV58HU09M2 and U18M2
VW3A58822	Fan Kit for ATV58HU29M2, U41M2, and U18N4 to U41N4

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Table 43: ATV58 *TRX* Accessories *(cont.)*

Catalog No.	Description
VW3A58823	Fan Kit for ATV58HU54M2, U72M2, and U54N4 to U90N4
VW3A58824	Fan Kit for ATV58HU90M2, D12M2, and D12N4 to D23N4
VW3A58825	Fan Kit for ATV58HD16M2, D23M2, and D28N4 to D46N4
VW3A58826	Fan Kit for ATV58HD28M2 to D46M2 and D54N4 to D79N4
VW3A58831	EMC Kit for ATV58HU09M2 and U18M2
VW3A58832	EMC Kit for ATV58HU29M2, U41M2, and U18N4 to U41N4
VW3A58833	EMC Kit for ATV58HU54M2, U72M2, and U54N4 to U90N4
VW3A58834	EMC Kit for ATV58HU90M2, D12M2, and D12N4 to D23N4
VW3A58842	Conduit Box Kit for ATV58HU09M2 and U18M2
VW3A58843	Conduit Box Kit for ATV58HU29M2, U41M2, and U18N4 to U41N4
VW3A58844	Conduit Box Kit for ATV58HU54M2, U72M2, and U54N4 to U90N4
VW3A58845	Conduit Box Kit for ATV58HU90M2, D12M2, and D12N4 to D23N4
VW3A58846	Conduit Box for ATV58HD16M2, D23M2, and D28N4 to D46N4
VW3A58847	Conduit Box for ATV58HD28M2 to D46M2 and D54N4 to D79N4
VW3A58848	Conduit Box for ATV58HC10N4
VW3A58849	Conduit Box for ATV58HC13N4 to HC19N4
VW3A58850	Conduit Box for ATV58HC23N4 to HC33N4
VW3A66711	DB Resistor Kit for ATV58HU09M2, U18M2, U18N4 to U72N4
VW3A66712	DB Resistor Kit for ATV58HU29M2, U41M2, U90N4, D12N4
VW3A66713	DB Resistor Kit for ATV58HU54M2, U72M2, D16N4, D23N4
VW3A66714	DB Resistor Kit for ATV58HU90M2, D12M2, and D28N4 to D46N4
VW3A66715	DB Resistor Kit for ATV58HD16M2, D23M2, D54N4
VW3A66716	DB Resistor Kit for ATV58HD28M2, D33M2, D46M2, D64N4, and D79N4

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Repair Parts

Table 44: ATV58 *TRX* Repair Parts

Description		For Use on Drives	Catalog Number
ATV58 *TRX* Control Board Kit		ATV58 Type E,F,H, and N, except ATV58H...C10N4–C33N4	VX4A581U
Internal fan kit	Frame Sizes 2 and 3 (two fans)	ATV58...U29M2, U41M2, U54M2, U72M2, U18N4, U29N4, U41N4, U54N4, U72N4, U90N4	VZ3V58223U
	Frame Sizes 4 and 5 (three fans)	ATV58...U90M2, D12M2, D12N4, D16N4, D23N4	VZ3V58245U
	Frame Size 6 (four fans)	ATV58...D16M2, D23M2, D28N4, D33N4, D46N4	VZ3V58260U
	Frame Size 7 (four fans)	ATV58...D28M2, D33M2, D46M2 D54N4, D64N4, D79N4	VZ3V58270U
Control Terminals	Removable ATV58 Control Board Terminal Strips. Includes relay terminal strip, 9 position terminal strip, and 10 position terminal strip.	ATV58 Type E, F, H, and N	VZ3N581U
Power Terminal Blocks	For Frame Size 6	ATV58...D16M2, D28N4, D33N4	VZ3N58160U
	For Frame Size 6	ATV58...D23M2, D46N4	VZ3N58165U
	For Frame Size 7	ATV58...D28M2, D33M2, D46M2 D54N4, D64N4, D79N4	VZ3N58170U
Internal EMC Filter Kit	For Frame Size 6	ATV58HD28N4	VX4A58861U
		ATV58HD33N4	VX4A58862U
		ATV58HD46N4	VX4A58863U
	For Frame Size 7	ATV58HD54N4	VX4A58871U
		ATV58HD64N4	VX4A58872U
		ATV58HD79N4	VX4A58873U
Power Boards for Frame Sizes 6 and 7		ATV58HD16M2	VX5A58D16M2U
		ATV58HD23M2	VX5A58D23M2U
		ATV58HD28M2	VX5A58D28M2U
		ATV58HD33M2	VX5A58D33M2U
		ATV58HD46M2	VX5A58D46M2U
		ATV58HD28N4	VX5A58D28N4U
		ATV58HD33N4	VX5A58D33N4U
		ATV58HD46N4	VX5A58D46N4U
		ATV58HD54N4	VX5A58D54N4U
		ATV58HD64N4	VX5A58D64N4U
		ATV58HD79N4	VX5A58D79N4U

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Table 44: ATV58 *TRX* Repair Parts *(cont.)*

Description		For Use on Drives	Catalog Number
Power Components	Output transistor module	ATV58...D28N4	VZ3IM6075M1258U
		ATV58...D16M2, D33N4	VZ3IM6100M1258U
		ATV58...D23M2, D28M2, D46N4, D54N4	VZ3IM6150M1258U
		ATV58...D33M2, D46M2, D64N4, D79N4	VZ3IM2200M1258U
	Dynamic braking transistor	ATV58...D16M2, D23M2, D28N4, D33N4, D46N4	VZ3IM1050M1258U
		ATV58...D28M2, D54N4	VZ3IM1100M1258U
		ATV58...D33M2, D46M2, D64N4, D79N4	VZ3IM1150M1258U
	Input diode/transistor bridge	ATV58...D16M2, D28N4, D33N4	VZ3TD1055M1658U
		ATV58...D23M2, D28M2, D46N4, D54N4	VZ3TD1090M1658U
		ATV58...D33M2, D46M2, D64N4, D79N4	VZ3TD1130M1658U
Control board		ATV58H...C10N4–C33N4	VX4A381
Interface board		ATV58H...C10N4–C33N4	VX4A382
Gate drive board		ATV58H...C10N4–C33N4	VX5A38C10
Gate board		ATV58H...C10N4	VX5A38C11
Current gain board		ATV58H...C10N4 ATV58H...C13N4–C15N4 and C25N4 ATV58H...C19N4 ATV58H...C23N4 and C28N4 ATV58H...C31N4 ATV58H...C33N4	VX5A38C12 VX5A38C13 VX5A38C14 VX5A38C15 VX5A38C16 VX5A38C17
Precharge contactor kit		ATV58H...C10N4 ATV58H...C13N4 ATV58H...C15N4–C19N4 ATV58H...C23N4–C33N4	VY1A38101 VY1A38102 VY1A38103 VY1A38104
Current transformer		ATV58H...C10N4 ATV58H...C13N4 ATV58H...C15N4–C19N4 ATV58H...C23N4–C25N4 ATV58H...C28N4–C33N4	VY1A38111 VY1A38112 VY1A38113 VY1A38114 VY1A38115
Power supply board		ATV58...C10N4–C33N4	VY1A38120
Insulating sheets		ATV58H...C10N4 ATV58H...C13N4–C19N4 ATV58H...C23N4–C33N4	VY1A38210 VY1A38211 VY1A38212
Thermal grease			VY1A58856
Screw kit		ATV58H...C10N4 ATV58H...C13N4 ATV58H...C15N4 ATV58H...C19N4 ATV58H...C23N4–C25N4 ATV58H...C28N4–C33N4	VY1ADV384 VY1ADV385 VY1ADV386 VY1ADV387 VY1ADV388 VY1ADV389

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Table 44: ATV58 *TRX* Repair Parts *(cont.)*

Description	For Use on Drives	Catalog Number
Capacitor kit	ATV58H...C10N4 ATV58H...C13N4–C19N4 ATV58H...C23N4–C25N4 ATV58H...C28N4–C33N4	VZ3C3810 VZ3C3811 VZ3C3812 VZ3C3813
Input diode bridge	ATV58...C10N4–C33N4	VZ3D381
Input filter	ATV58...C10N4–C33N4	VZ3D382
Power fuse	ATV58H...C10N4 ATV58H...C13N4–C19N4 ATV58H...C23N4–C25N4 ATV58H...C28N4–C33N4	VZ3F3801 VZ3F3802 VZ3F3803 VZ3F3804
Thermal sensor	ATV58H...C10N4–C33N4	VZ3G381
Output transistor	ATV58H...C10N4	VZ3I381
Output transistor kit	ATV58H...C13N4–C19N4 ATV58H...C23N4–C25N4 ATV58H...C28N4–C33N4	VZ3I382 VZ3I383 VZ3I384
Internal cable kit	ATV58H...C10N4 ATV58H...C13N4–C19N4 ATV58H...C23N4–C33N4	VZ3N3808 VZ3N3809 VZ3N3810
Precharge resistor	ATV58H...C10N4 ATV58H...C13N4–C19N4 ATV58H...C23N4–C33N4	VZ3R3810 VZ3R3811 VZ3R3812
Control transformer	ATV58H...C10N4 ATV58H...C13N4–C19N4 ATV58H...C23N4–C33N4	VZ3TR381 VZ3TR382 VZ3TR383
Heatsink fans	ATV58H...C10N4 ATV58H...C13N4–C19N4 ATV58H...C23N4–C33N4	VZ3V3808 VZ3V3809 VZ3V3810
Internal fan kit	ATV58H...C10N4–C19N4 ATV58H...C19N4 ATV58H...C23N4–C33N4	VZ3V3818 VZ3V3819 VZ3V3820

Returns and Exchanges

Factory repaired ATV58 *TRX* drive controllers are available within 24 hours from a factory exchange pool, or your drive controller can be factory repaired and returned. Contact your local Schneider Electric distributor or customer service representative for information about availability.

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