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Instruction Bulletin

ALTIVAR® 58 *TRX* Adjustable Speed Drive Controllers

Installation Guide
Type N Controllers

Telemecanique

SQUARE D

⚠ DANGER

HAZARDOUS VOLTAGE

- Read and understand this bulletin in its entirety before installing or operating ALTIVAR 58 *TRX* drive controllers. Installation, adjustment, repair, and maintenance of the drive controllers must be performed 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 open position.
  - — WAIT THREE MINUTES for the DC bus capacitors to discharge. Then follow the DC bus voltage measurement procedure on page 17 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.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

- This equipment must be installed and serviced only by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside the equipment.
- Always use a properly rated voltage sensing device to confirm that the power is off.
- Replace all devices, doors, and covers before turning on power to this equipment.

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

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 and expanded firmware capabilities. As a Transparent Ready product equipped with an Ethernet connection, the ATV58 *TRX* product line can be configured, controlled, monitored, and diagnosed over an Ethernet network with a standard Web browser. No special software or drivers are needed.

The ATV58 *TRX* product line updates apply to drive controllers manufactured after August, 2002.

Product Range

The ATV58 *TRX* Type N drive controllers are Type 4/4X devices. They are available in the following ranges:

- 1 to 10 hp (0.75 to 7.5 kW), 460 V, three-phase input
- 0.5 to 3 hp (0.37 to 2.2 kW), 240 V, single-phase input
- 2 to 5 hp (1.5 to 4.0 kW), 240 V, three-phase input

Related Documentation

This instruction bulletin covers the technical characteristics, specifications, installation, and wiring of ATV58 *TRX* Type N drive controllers. For information on programming and maintenance, refer to the keypad display instruction bulletin, VVDED397047US.

Many options are available for the ATV58 *TRX* Type N drive controllers. Refer to Appendix A for a list of these options. Refer to catalog 8806CT9901 for a complete description of the options.

RECEIVING AND PRELIMINARY INSPECTION

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 packing carton usually indicates improper handling. If any damage is found, notify the carrier and your Square D representative.

After removing the drive controller from its packaging, inspect the exterior of the controller for shipping damage. If any shipping 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.

⚠ CAUTION

EQUIPMENT DAMAGE HAZARD

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

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

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 to +149 °F (-25 to +65 °C). If the drive controller must be shipped to another location, use the original shipping material and carton to protect the drive controller.

TECHNICAL CHARACTERISTICS

Table 1 shows the technical characteristics of single-phase input, three-phase output drive controllers, rated for 200 V -10% to 240 V +10%, for use at 50/60 Hz ±5%.

Table 1: 200 to 240 V, Single-Phase Input, Three-Phase Output Drive Controllers

Drive Controller Catalog Number [1]	Input Line Current [2] Single Phase 200 V	240 V	Motor Power [3]		Rated Output Current (In)	Transient Output Current [4]	Total Dissipated Power @ Rated Load	Short-Circuit Current Rating
	A	A	kW	hp	A	A	W	A rms sym.
ATV58NU09M2•	5.6	4.7	0.37	0.5	2.3	3.1	42	2000
ATV58NU18M2•	9.8	8.3	0.75	1	4.1	5.6	64	2000
ATV58NU29M2•	18.5	15.6	1.5	2	7.8	10.6	107	5000
ATV58NU41M2•[5]	25.6	21.6	2.2	3	11.0	15.0	160	5000

[1] Complete the catalog number by entering KU for ATV58 *TRX* Type N controllers with factory-installed keypad, or ZU for controllers without a factory-installed keypad. For catalog numbers ending in ZU, an operator interface must be used to modify factory settings. Order separately. Refer to Appendix A or catalog 8806CT9901 for available interface options.

[2] Values indicate the current absorbed by drive controllers supplied by mains with fault capacity equal to the short-circuit rating indicated in the table, and under nominal conditions of motor load and speed without additional inductance. Values are accurate for drive controllers operating at 40 °C maximum. For operation at 50 °C, see Table 5 on page 11.

[3] Power indicated is for a switching frequency between 0.5 and 4 kHz, and at steady state. For switching frequency between 8 and 16 kHz, derate the drive controller by one horsepower size (for example, for 0.5 hp, order drive controller ATV58NU18M2). If the duty cycle (i.e., drive controller run time) does not exceed 60% (36 second maximum for a 60 second cycle), derating is not required for operation above 8 kHz.

[4] For 60 seconds.

[5] When these drive controllers are used with a single-phase input, a line inductor must be used. For inductor selection, see catalog 8806CT9901.

Table 2 shows the technical characteristics of three-phase input, three-phase output drive controllers, rated for 200 V -10% to 240 V +10%, for use at 50/60 Hz ±5%.

Table 2: 200 to 240 V, Three-Phase Input, Three-Phase Output Drive Controllers

Drive Controller Catalog Number [1]	Input Line Current [2] Three Phase 200 V	240 V	Motor Power [3]		Rated Output Current (In)	Transient Output Current [4]	Total Dissipated Power @ Rated Load	Short-Circuit Current Rating
	A	A	kW	hp	A	A	W	A rms sym.
ATV58NU29M2•	9.7	8.3	1.5	2	7.8	10.6	107	5000
ATV58NU41M2•	13.4	11.4	2.2	3	11.0	15.0	160	5000
ATV58NU72M2•	22.4	19.5	4	5	18.2	24.7	240	5000

[1] Complete the catalog number by entering KU for ATV58 *TRX* Type N controllers with factory-installed keypad, or ZU for controllers without a factory-installed keypad. For catalog numbers ending in ZU, an operator interface must be used to modify factory settings. Order separately. Refer to Appendix A or catalog 8806CT9901 for available interface options.

[2] Values indicate the current absorbed by drive controllers supplied by mains with fault capacity equal to the short-circuit rating indicated in the table, and under nominal conditions of motor load and speed without additional inductance. Values are accurate for drive controllers operating at 40 °C maximum. For operation at 50 °C, see Table 5 on page 11.

[3] Power indicated is for a switching frequency between 0.5 and 4 kHz, and at steady state. For switching frequency between 8 and 16 kHz, derate the drive controller by one horsepower size (for example, for 2 hp, order drive controller ATV58NU41M2). If the duty cycle (i.e., drive controller run time) does not exceed 60% (36 seconds maximum for a 60 seconds cycle), derating is not required for operation above 8 kHz.

[4] For 60 seconds.

Table 3 shows the technical characteristics of three-phase input, three-phase output drive controllers, rated for 400 V -15% to 460 V +20%, for use at 50/60 Hz ±5%.

Table 3: 400 to 460 V, Three-Phase Input, Three-Phase Output Drive Controllers

Drive Controller Catalog Number [1]	Input Line Current [2] Three Phase		Motor Power [3]		Rated Output Current (In)	Transient Output Current [4]	Total Dissipated Power @ Rated Load	Short-Circuit Current Rating
	400 V	460 V						
	A	A	kW	hp	A	A	W	A rms sym.
ATV58NU18N4•	3.4	2.6	0.75	1	2.3	3.1	57	5000
ATV58NU29N4•	6.0	4.5	1.5	2	4.1	5.6	97	5000
ATV58NU41N4•	7.8	6.0	2.2	3	5.8	7.9	120	5000
ATV58NU54N4•	10.2	7.8	3	–	7.8	10.6	170	5000
ATV58NU72N4•	13.0	10.1	4	5	10.5	14.3	210	5000
ATV58NU90N4•	17.0	13.2	5.5	7.5	13.0	17.7	295	5000
ATV58ND12N4•	26.5	21.0	7.5	10	17.6	24.0	360	22,000

[1] Complete the catalog number by entering KU for ALTIVAR 58 Type N controllers with factory-installed keypad, or ZU for controllers without a factory-installed keypad. For catalog numbers ending in ZU, an operator interface must be used to modify factory settings. Order separately. Refer to Appendix A or catalog 8806CT9901 for available interface options.

[2] Values indicate the current absorbed by drive controllers supplied by mains with fault capacity equal to the short-circuit rating indicated in the table, and under nominal conditions of motor load and speed without additional inductance. Values are accurate for drive controllers operating at 40 °C maximum. For operation at 50 °C, see Table 5 on page 11.

[3] Power indicated is for a switching frequency between 0.5 and 4 kHz, and at steady state. For switching frequency between 8 and 16 kHz, derate the drive controller by one horsepower size (for example, for 1 hp, order drive controller ATV58HU29N4). If the duty cycle (i.e., drive controller run time) does not exceed 60% (36 seconds maximum for a 60 seconds cycle), derating is not required.

[4] For 60 seconds.

SPECIFICATIONS

Table 4: Environmental Specifications

Degree of protection	Type 4/4X indoors. Type 4/4X outdoors with closing plate installed in door. Do not expose drive controller to direct sunlight or exceed the maximum ambient temperature.
Resistance to vibrations	According to IEC 60068-2-6: 1.5 mm peak from 3 to 13 Hz 1 g from 13 to 200 Hz
Resistance to shocks	According to IEC 60068-2-27: 15 g, 11 ms
Pollution degree (in the drive controller enclosure)	Pollution degree 2 according to IEC 60664-1, EN50718 and NEMA ICS-1. Protect the drive controller against dust, corrosive gas, and falling liquid.
Maximum relative humidity (in the drive controller enclosure)	95% maximum, non-condensing and without dripping according to IEC 60068-2-3. Provide a heating system if there is condensation in the enclosure.
Maximum ambient temperature	Storage: -25 to +65 °C (-13 to +149 °F) Operation (see page 11 for maximum current capabilities): -10 to +40 °C (+14 to 104 °F) without derating -10 to +50 °C (+14 to 122 °F) with derating of the current. See “Operation Above 40 °C” on page 11.
Altitude	3300 ft (1000 m) maximum without derating; derating of the current by 1% for each additional 330 ft (100 m)
Operational position	Vertical, ±10°, with power terminals at the bottom.

Operation Above 40 °C

Some of the ATV58 *TRX* Type N drive controllers can be operated above 40 °C and 50 °C without derating if the maximum input and output currents do not exceed the values in Table 5. To operate the drive controller between 40 and 50 °C, one of the following must be observed:

1. Derate the drive controller by one hp size.
2. Measure the input current to ensure that it does not exceed the maximum value listed in Table 5.

Table 5: Maximum Drive Controller Current Capabilities

Line Voltage	Input	Motor Power		ATV58N•••••	Max. Drive Controller Current at 50 °C		Input Current w/ 3% Line Reactor		Output Current
		kW	hp		Input	Output	@ Vmin	@ Vmax	
200 to 240 VAC	Single Phase	0.37	0.5	U09M2	5.6	2.3	4.2	3.6	2.3
		0.75	1	U18M2 [1]	5.6	2.3	7.9	6.5	4.1
		1.50	2	U29M2	18.5	7.8	14.2	11.9	7.8
		2.20	3	U41M2 [1]	18.5	7.8	20.5	16.9	11.0
	Three Phase	1.50	2	U29M2	9.7	7.8	6.6	5.7	7.8
		2.20	3	U41M2	10.7	11.0	9.5	8.2	11.0
		3.00	—	U54M2	—	—	12.6	10.5	13.7
		4.00	5	U72M2 [1]	10.7	11.0	16.9	13.6	18.2
400 to 460 VAC	Three Phase	0.75	1	U18N4	3.7	2.3	2.0	1.5	2.3
		1.50	2	U29N4	5.9	4.1	3.9	2.8	4.1
		2.20	3	U41N4 [1]	5.9	4.1	5.1	4.1	5.8
		3.00	—	U54N4	—	—	6.7	5.4	7.8
		4.00	5	U72N4	12.4	10.5	9.2	7.0	10.5
		5.50	7.5	U90N4	12.4	11.0	12.6	9.8	13.0
		7.50	10	D12N4 [1]	12.0	12.0	17.2	12.8	17.6

[1] Drive controller has been derated by one hp size for operation above 40 °C.

If the input current exceeds the levels in Table 5, ensure that the drive controller is operating within its thermal limits by:

- Reducing the load requirements.
- Installing line reactors to reduce the input current.
- Lowering the available short-circuit current by providing a supply line impedance which emulates a 3% or greater line reactor.

Table 6: Electrical Specifications

Input voltage	200 V -15% to 240 V +15% single-phase input 200 V -15% to 240 V +15% three-phase input 400 V -15% to 460 V + 20% three-phase input
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) [1]
Switching frequency	4 kHz, configurable with programming accessories [1] 0.5 - 1 - 2 - 4 - 8 kHz without derating 12 - 16 kHz with derating of one hp rating in steady state 12 - 16 kHz without derating and with reduced duty cycle [2]
Speed range	1:100 open loop (for example 0.6 Hz to 60 Hz)
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. [1] ±0.02% of rated motor speed with optional digital I/O card and appropriate encoder feedback. [1]
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).
Transient output current	160% of nominal NEC rated motor current for 60 seconds (for constant torque ratings).
Transient motor torque	200% of nominal motor torque (typical value at ±10%) for 2 seconds (for constant torque ratings). 170% of nominal motor torque (typical value at ±10%) for 60 seconds (for constant torque ratings).

[1] See Appendix A for a list of accessories.

[2] 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.

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

Table 6: Electrical Specifications (Continued)

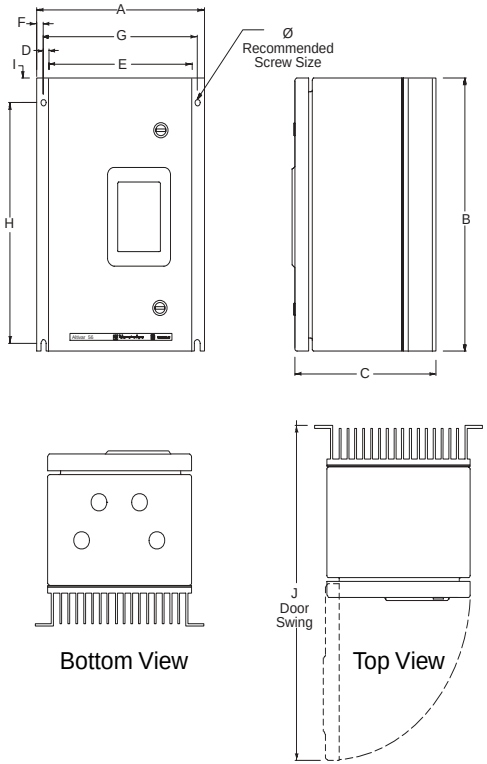
Drive controller protection	Protection against short circuits: • between output phases • between output phases and ground • on outputs of internal supplies Thermal protection against overheating and overcurrent. Undervoltage and overvoltage faults. Protection against single-phase input operation on the three-phase drive controllers.
Motor protection	Thermal protection integrated in the drive controller by continuous calculation of I^2t, taking motor speed into account.[3] 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. [1] Protection against motor phase loss. Protection by motor thermal sensors with analog option card. [1]
Codes and standards	UL Listed per UL 508C as incorporating electronic overload protection. UL File E138755 CCN NMMS cUL Listed per Canadian Standard C22.2 No. 14. CSA File LR60905 Conforms to applicable NEMA ICS, NFPA, IEC, and ISO 9001 standards.

[1] See Appendix A for a list of accessories.

[2] 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.

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

DIMENSIONS



See Table 8 on page 19 for conduit hole size.

Figure 1: ATV58N••••• Dimensions

Catalog No. ATV58N•••••	A in. (mm)	B in. (mm)	C in. (mm)	D in. (mm)	E in. (mm)	F in. (mm)	G in. (mm)	H in. (mm)	I in. (mm)	J in. (mm)	Ø in. (mm)	Weight lb (kg)
U09M2, U18M2	9.42 (239)	12.50 (317)	7.88 (200)	0.29 (7)	8.05 (204)	0.40 (10)	8.63 (219)	11.00 (279)	1.12 (28)	15.30 (389)	1/4-20 (M6)	18 (8.2)
U29M2, U41M2, U18N4, U29N4, U41N4	10.88 (276)	14.00 (356)	10.06 (256)	0.31 (8)	9.00 (229)	0.62 (15.8)	9.63 (245)	12.50 (317)	1.12 (28)	18.43 (468)	1/4-20 (M6)	28 (12.7)
U72M2, U54N4, U72N4, U90N4	11.75 (298)	16.00 (406)	11.00 (279)	0.38 (10)	10.00 (254)	0.50 (13)	10.75 (273)	14.25 (362)	1.25 (32)	20.37 (517)	3/8-16 (M10)	42 (19.1)
D12N4	15.25 (387)	20.00 (508)	14.75 (375)	0.50 (13)	13.25 (337)	0.50 (13)	14.25 (362)	18.25 (464)	1.25 (32)	27.37 (695)	3/8-16 (M10)	67 (30.5)

INSTALLATION PRECAUTIONS

Observe the following precautions when installing the ATV58 *TRX* Type N drive controller:

⚠ DANGER

HAZARDOUS VOLTAGE

Before working on this equipment:

- Disconnect all power.
- Place a “DO NOT TURN ON” label on the drive controller disconnect.
- Lock the disconnect in open position.

Electrical shock will result in death or serious injury.

- 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 13 to 18 on pages 31 to 32 for recommended overcurrent protection.
- Verify that the voltage and frequency characteristics of the input line match the drive controller nameplate rating.
- Install the drive controller in an environment that does not exceed Type 4/4X limitations.
- Do not place the drive controller near any heat generating sources. Do not mount it directly above another drive controller.
- Mount the drive controller on a flat, solid surface to achieve proper air flow.
- Install the drive controller vertically, ±10°, with the power terminals at the bottom.
- Leave enough room in front of the drive controller for door swing. See “Dimensions” on page 14.

MOUNTING THE CONTROLLER

When mounting the ATV58 *TRX* Type N drive controller, observe the following guidelines:

- Mount the drive controller on a solid, flat surface.
- Use bolts with washers to secure the controller.
- To maintain a minimum distance between drive controllers, do not overlap the mounting feet.
- Do not mount the drive controller directly above another controller or a heat generating source.
- Do not mount the drive controller in direct sunlight or exceed the maximum ambient temperature.
- In outdoor applications, the keypad must be mounted internally (on the drive controller, not the door).

WIRING

Before wiring the drive controller, first perform the bus voltage measurement procedure on page 17. Figure 2 shows the location of the terminal strips.

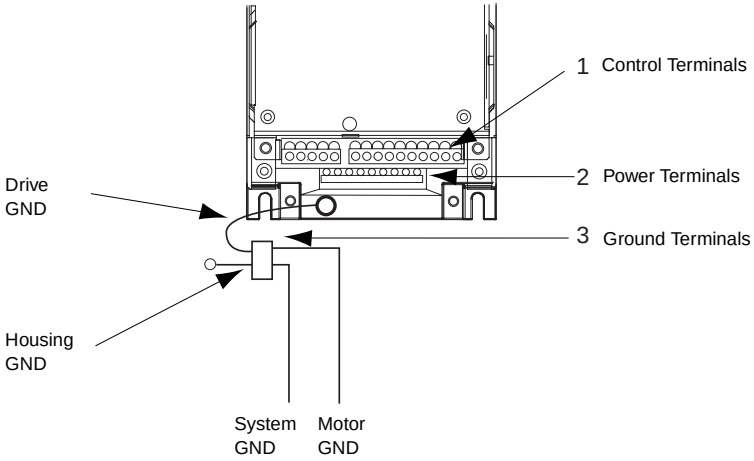


Figure 2: Wiring Terminals (Bottom of Controller, Door Open)

Bus Voltage Measurement Procedure

⚠ DANGER

HAZARDOUS VOLTAGE

- Read and understand the bus voltage measurement procedure before performing procedure. Measurement of bus capacitor voltage must be performed by qualified personnel.
- DO NOT short across 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. Use only electrically insulated tools.

Electrical shock will result in death or serious injury.

Measure the voltage between the + and - terminals as shown in Table 7. Refer to Figure 3 for terminal location.

Table 7: DC Bus Measurement Terminals

Drive Controller ATV58N•••••	+ Terminal	- Terminal
U09M2 and U18M2	J2-4 (+)	J2-5 (-)
All other ATV58 *TRX* Type N controllers	J2-5 (PA)	J18-7

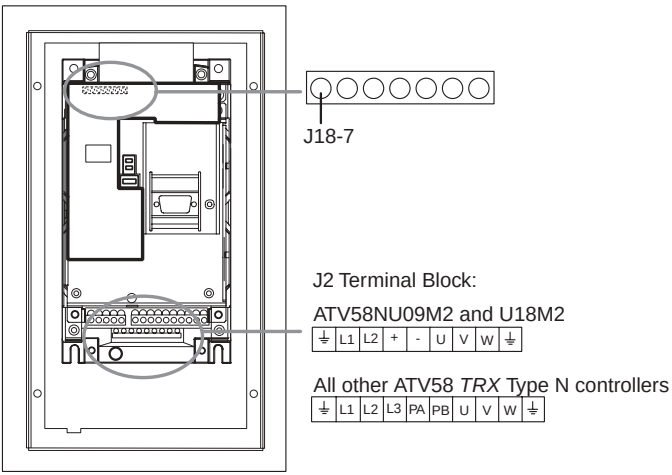


Figure 3: DC Bus Measurement Terminals

To measure the bus capacitor voltage:

1. Disconnect all power from the drive controller.
2. Wait three minutes to allow the DC bus to discharge.
3. Unlatch and open the door.
4. Set the voltmeter to the 1000 Vdc scale. Measure the voltage between the + terminal and the - terminal to verify that the DC voltage is less than 45 V for each measurement.
5. If the bus capacitors are not fully discharged, contact your local Square D representative – do not operate the drive controller.
6. Close and latch the door.

General Wiring Practices

Good wiring practice requires the separation of control circuit wiring from all 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/or control 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

EQUIPMENT DAMAGE HAZARD

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 these practices when wiring ATV58 *TRX* Type N drive controllers:

- Use metallic conduit for all drive controller wiring. Do not run control and power wiring, or output power wiring for more than one drive controller, in the same conduit.
- 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).
- Whenever power and control wiring cross, the metallic conduits and non-metallic conduits or trays must cross at right angles.

- Equip all inductive circuits near the drive (relays, contactors, solenoid valves) with noise suppressors or connect them to a separate circuit.

Conduit Connections

The ATV58 *TRX* Type N controller is furnished with four conduit openings at the bottom for input and output power wiring, control wiring, and connection to external components such as DB resistors or line reactors. The holes are pre-drilled for the conduit recommended in Table 8 and are closed with Type 4/4X-rated plugs. To maintain the Type 4/4X rating, do not remove the plugs from unused conduit holes.

Table 8: Recommended Conduit

Drive Controller Catalog No.	Conduit Hole Size	Recommended Conduit	Hub Catalog No.
ATV58NU09M2, ATV58NU18M2	7/8 inch	1/2 inch	25211-16102
All other ATV58 *TRX* Type N Drive Controllers	13/32 inch	3/4 inch	25211-24102

Branch Circuit Connections

Refer to NEC Article 430 for sizing 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 short-circuit current at the drive controller input terminals.

Select the input current corresponding to the available short-circuit current capability or the line impedance present. If the available short-circuit current capability of the branch circuit is limited by fuses or circuit breakers (not system impedance), use the available short-circuit 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 1–3 on pages 7–9 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 13–15 on page 31 of this manual to achieve published short-circuit current ratings.
- Do not connect the drive controller to a power feeder whose short-circuit capacity exceeds the drive controller short-circuit current rating listed on the drive controller nameplate or Tables 1 to 3 (pages 7 to 9).

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

Output Wiring Precautions

⚠ WARNING

DRIVE CONTROLLER DAMAGE

The drive controller will be damaged if input line voltage is applied to output terminals (U, V, W). Check 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: the cable selected must have a low capacitance phase-to-phase and 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 affect controller and/or motor performance.

- 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 and/or power factor correction capacitors on the output of the drive controller.**
- Provide at least 20 in. (500 mm) of cable at the drive controller output (U, V, W) for the minimum inductance needed to protect the drive controller output from short circuits.

⚠ CAUTION

DRIVE CONTROLLER SWITCH FAILURE

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 National Electrical Code and all local codes. To ground the drive controller:

- Connect the system ground conductor and the motor ground conductor to the ground bar located on the heat sink. See Figure 4 for ground connection locations. Wire size is determined by the drive controller size and by national and local codes.
- Verify that resistance to ground is one Ω or less. Improper grounding causes intermittent and unreliable operation.

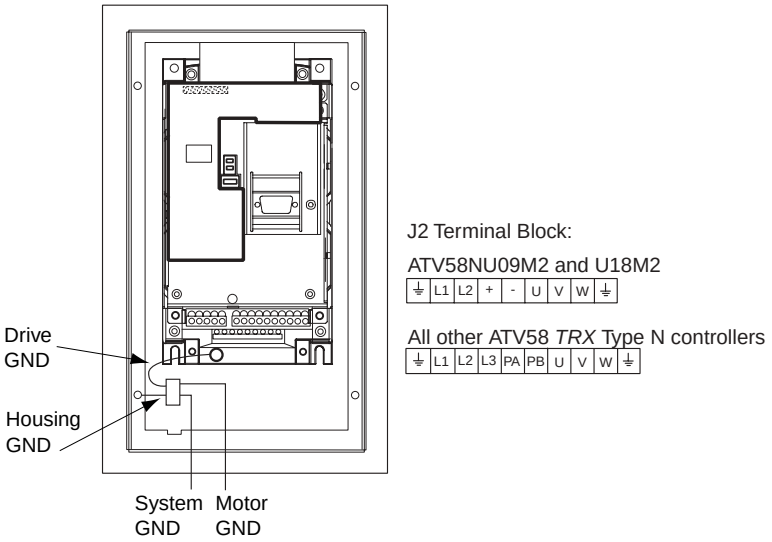


Figure 4: Grounding

⚠ DANGER

HAZARDOUS VOLTAGE

Ground equipment using the provided ground connecting point as shown in Figure 4. The drive controller panel must be properly grounded before power is applied.

Do not use metallic conduit as a ground conductor.

Electrical shock will result in death or serious injury.

Ground multiple drive controllers as shown in Figure 5. Use one grounding conductor per device. Do not loop ground conductors or install them in series.

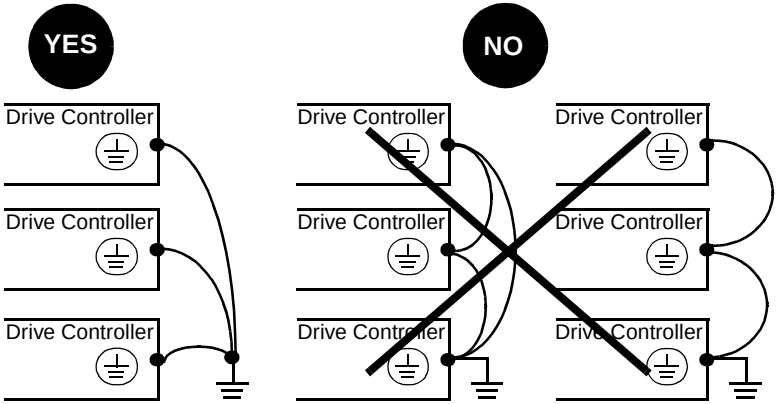


Figure 5: Grounding Multiple Drive Controllers

Power Terminals

ATV58NU09M2 and U18M2
(single-phase input only)

All other ATV58 *TRX* Type N drive controllers

Table 9: Function of Power Terminals

Terminal	Function	For ATV58•
⏚	Ground terminal	All models
L1 L2	Input power	All models
L3		All models except U09M2 and U18M2
+ -	Connection for DB module	U09M2 and U18M2
PA PB	Connection for DB resistor	All models except U09M2 and U18M2
U V W	Output connections to motor	All models
⏚	Ground terminal	All models

Table 10: Power Terminal Wire Size and Torque

Drive Controller ATV58N•••••	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)
U72M2, U54N4, U72N4, U90N4	8 (6)	7.5 (0.85)
D12N4	6 (10)	20 (2.26)

[1] 75 °C copper.

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 6 shows the location of the control terminals.

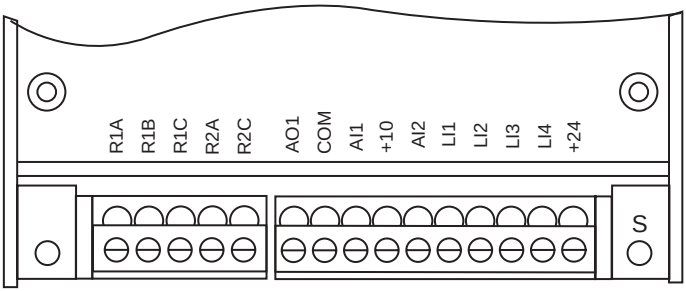


Figure 6: Location of Control Terminals

Table 11: Control Terminal Characteristics

Terminal	Function	Characteristics
S	Shield connection	
R1A R1B R1C	R1A to R1C is a N.O. contact. When the drive controller is powered with no fault, the contact is closed. R1B to R1C is a 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[1]	Analog current output X–Y mA analog output, with X and Y programmable from 0–20 mA. Factory setting: 0–20mA	Maximum load impedance = 500 Ω Resolution: 0.04 mA (9 bits) Linearity: +/- 0.1 mA Accuracy: +/- 0.2 mA The analog output is updated every 2mS, maximum

[1] AO1 is available only on controllers manufactured after August 2002.

Table 11: Control Terminal Characteristics (Continued)

Terminal	Function	Characteristics
AI1	Analog input 1 (voltage) Used for speed reference input	0 to 10 Vdc, Impedance = 30 kΩ 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 kΩ 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 Ω. Frequency resolution analog reference: high speed / 1024 Hz (10 bit). Accuracy ±1%, linearity ±0.5% of the maximum output frequency. Sampling time: 5 ms
LI1 LI2 LI3 LI4	Logic inputs See Table 21 on page 36 for factory settings.	Supplied by +24 Vdc State 0 if < 5 V, state 1 if > 11 V Vmax = 30 V Impedance = 3.5 kΩ 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

[1] AO1 is available only on controllers manufactured after August 2002.

⚠ 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.

Table 12: Factory Logic Input Settings

Logic Input	Hdg: Material Handling	GEn: General Use	VT: Variable Torque
LI1	Forward	Forward	Forward
LI2	Reverse	Reverse	Reverse
LI3	2 Preset speeds	Jog	Reference switching
LI4	4 Preset speeds	Freewheel stop	DC injection braking

⚠ WARNING

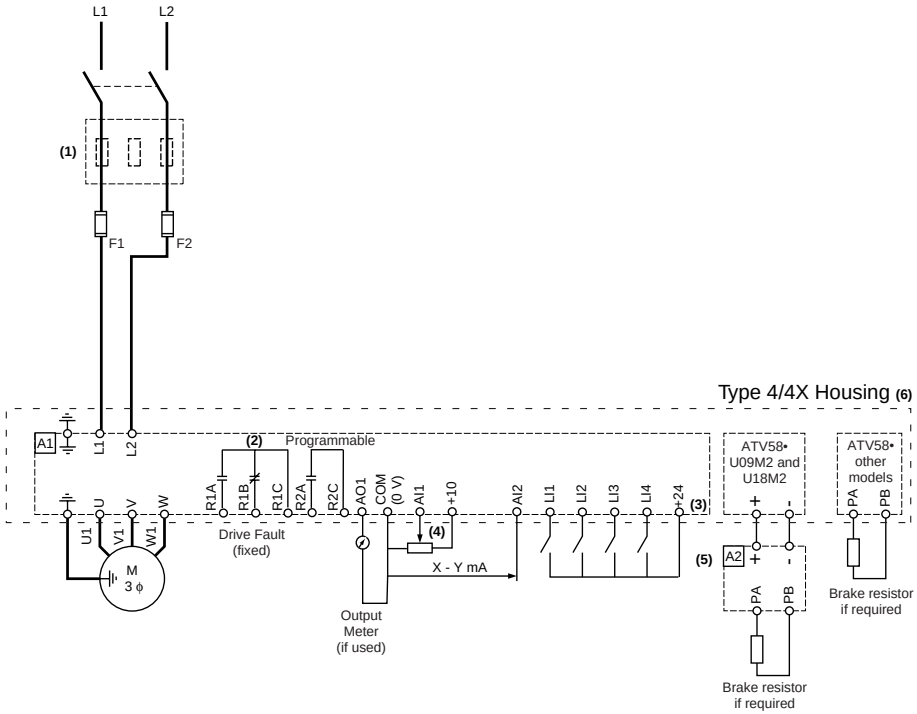
UNINTENDED EQUIPMENT OPERATION

If both logic inputs 1 and 2 are selected (high state) and logic input 1 reverts to zero state, the drive controller will 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.

WIRING DIAGRAMS

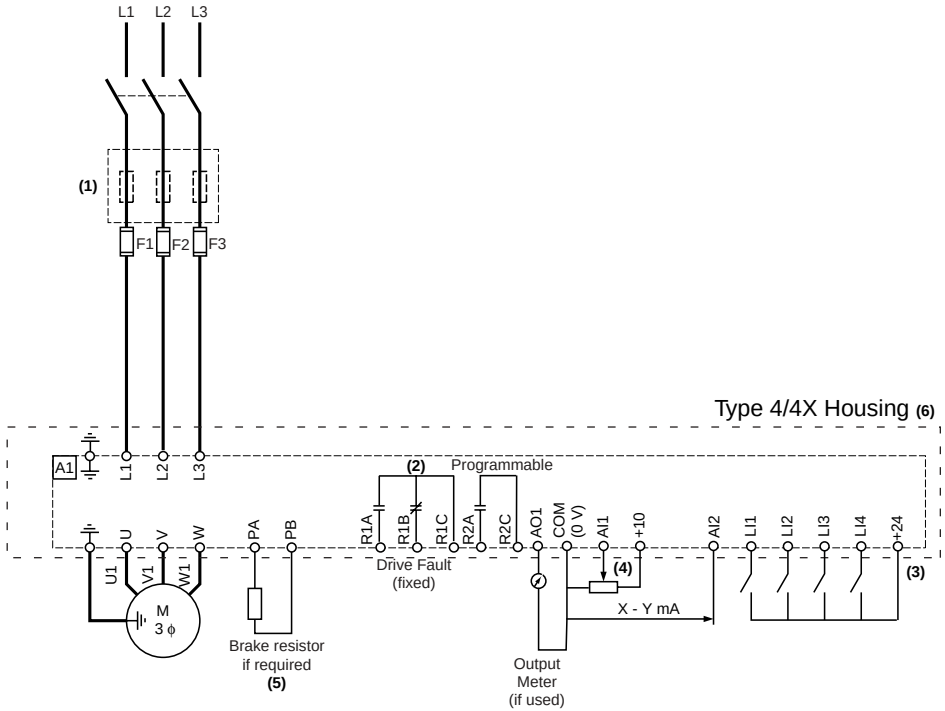
Single-Phase Input



(1) Line inductor if required. See catalog 8806CT9901 for recommendation.
(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 to the COM terminal.
Do not use the +24 terminal on the control board, but connect logic inputs to external +24 V.
See Figure 10 on page 34.
(4) Manual speed potentiometer (1–10 kW).
(5) Use dynamic braking module (A2) VW3A58701 with drive controllers ATV58NU09M2 and NU18M2 if dynamic braking is required. See catalog 8806CT9901 for braking resistor.
(6) Do not install additional components within the Type N controller.

Figure 7: Single-Phase Wiring Diagram

Three-Phase Input



(1) Line inductor if required. See catalog 8806CT9901 for recommendation.
(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 to the COM terminal.
Do not use the +24 terminal on the control board, but connect logic inputs to external +24 V.
See Figure 10 on page 34.
(4) Manual speed potentiometer (1–10 kW).
(5) See catalog 8806CT9901 for braking resistor.
(6) Do not install additional components within the Type N controller.

Figure 8: Three-Phase Wiring Diagram

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 the ATV58 *TRX* Type N drive controllers.

Fuses

The fuses specified in Tables 13–15 (page 31) are suitable for branch short circuit protection and provide excellent short circuit protection for the drive.

Circuit Breakers

The circuit breakers specified in Tables 16–18 (page 32) will also provide branch short circuit protection. Because circuit breakers are typically slower than fuses, they are not as effective in limiting damage to the drive controller in the event of an internal drive short circuit such as shorted bus connections, shorted input rectifier, or failure of the internal solid state overcurrent protection circuit in the drive controller.

⚠ WARNING

RISK OF EXPLOSION, RISK OF EXPULSION OF DEBRIS AND EMISSION OF FLAME

To mitigate or avoid this hazard, implement one of the following precautions:

- Use the fuses listed in Tables 13–15 of this instruction bulletin as the overcurrent protective devices for the drive controller instead of circuit breakers.
- Locate the drive controller only in areas where the explosion, expulsion of debris, and emission of flame pose no hazards to personnel or property.

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

Recommended Power Fuses

Table 13: 200/240 V Single-Phase Drive Controllers

M Motor [1]		A1 Drive Controller	F1, F2 Line Power Fuses
hp	kW	ATV58N•••••	Class J [2]
0.5	0.37	U09M2	10
1	0.75	U18M2	15
2	1.5	U29M2	30
3	2.2	U41M2	40

Notes to Table 13:

[1] Power shown for a switching frequency between 0.5 and 4 kHz, and at steady state. For switching frequency between 8 and 16 kHz, derate the controller by one hp size. For example, for 0.5 hp, order drive controller ATV58U18M2.

[2] Fast-acting. Class CC fuse may be used if recommended fuse rating is 20 A or lower.

Table 14: 200/240 V Three-Phase Drive Controllers

M Motor [1]		A1 Drive Controller	F1, F2, F3 Line Power Fuses
hp	kW	ATV58N•••••	Class J [2]
2	1.5	U29M2	15
3	2.2	U41M2	20
5	4	U72M2	35

Notes to Table 14:

[1] Power shown for a switching frequency between 0.5 and 4 kHz, and at steady state. For switching frequency between 8 and 16 kHz, derate the controller by one hp size. For example, for 2 hp, order drive controller ATV58U41M2.

[2] Fast-acting. Class CC fuse may be used if recommended fuse rating is 20 A or lower.

Table 15: 400/460 V Three-Phase Drive Controllers

M Motor [1]		A1 Drive Controller	F1, F2, F3 Line Power Fuses
hp	kW	ATV58N•••••	Class J [2]
1	0.75	U18N4	6
2	1.5	U29N4	10
3	2.2	U41N4	12
—	3	U54N4	15
5	4	U72N4	20
7.5	5.5	U90N4	30
10	7.5	D12N4	40

Notes to Table 15:

[1] Power shown for a switching frequency between 0.5 and 4 kHz, and at steady state. For switching frequency between 8 and 16 kHz, derate the controller by one hp size. For example, for 1 hp, order drive controller ATV58U29N4.

[2] Fast-acting.Class CC fuse may be used if recommended fuse rating is 20 A or lower.

Recommended Circuit Breakers

Table 16: 200/240 V Single-Phase Drive Controllers

M Motor		A1 Drive Controller	Continuous Rating	Square D Breaker or Equivalent
hp	kW	ATV58H•••••	A	
0.5	0.37	U09M2	15	FAL22015
1	0.75	U18M2	15	FAL22015
2	1.5	U29M2	30	FAL22030
3	2.2	U41M2	30	FAL22030

Table 17: 200/240 V Three-Phase Drive Controllers

M Motor		A1 Drive Controller	Continuous Rating	Square D Breaker or Equivalent
hp	kW	ATV58H	A	
2	1.5	U29M2	15	FAL36015
3	2.2	U41M2	20	FAL36020
—	3	U54M2	30	FAL36030
5	4	U72M2	35	FAL36035

Table 18: 400/460 V Three-Phase Drive Controllers

M Motor		CT, VTLN	Continuous Rating	Square D Breaker or Equivalent
hp	kW	ATV58H	(A)	
1	0.75	U18N4	15	FAL36015
2	1.5	U29N4	15	FAL36015
3	2.2	U41N4	15	FAL36015
—	3	U54N4	15	FAL36015
5	4	U72N4	20	FAL36020
7.5	5.5	U90N4	25	FAL36025
10	7.5	D12N4	40	FAL36040

USING DYNAMIC BRAKING

Consult Table 19 for minimum ohmic values when selecting dynamic braking resistors.

Table 19: Minimum Ohmic Value of Dynamic Braking Resistors

ATV58•••••	U09M2 U18M2	U29M2 U41M2	U54M2	U72M2	U18N4 U29N4 U41N4 U54N4	U72N4	U90N4	D12N4
Min. Resistance Ω	75	38	31	25	85	57	47	53

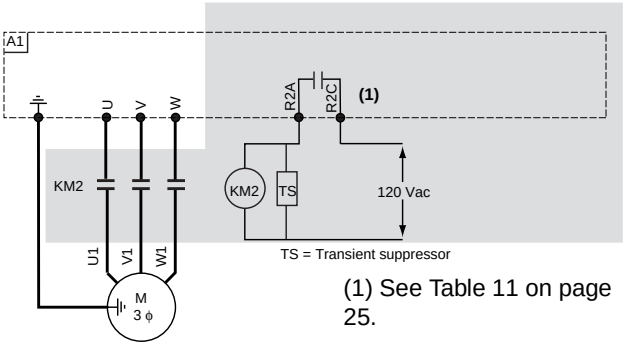
USING A LINE CONTACTOR

When controlling the power with an isolation line contactor, avoid frequently opening and closing the line contactor as this can cause premature failure of the filtering capacitors and precharge resistor. 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

Use the Output Contactor Command function with relay R2 or logic output LO on the I/O extension card. Refer to keypad display instruction bulletin, VVDED397047US, for more information on this function. In the wiring diagram, the shaded portion is to be added to either the single-phase input wiring diagram (Figure 7 on page 28) or the three-phase input wiring diagram (Figure 8 on page 29).

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



(1) See Table 11 on page 25.

Figure 9: Output Contactor Wiring Diagram

Table 20: Recommended Output Contactors

A1 ATV58N•••••	KM2 LC1-	A1 ATV58N•••••	KM2 LC1-
U09M2	D2510F7	U18N4	D2510 [1]
U18M2	D2510F7	U29N4	D2510 [1]
U29M2	D2510F7	U41N4	D2510 [1]
U41M2	D2510F7	U72N4	D2510 [1]
U72M2	D2510F7	U90N4	D2510 [1]
		D12N4	D2510 [1]

[1] Refer to the Square D *Digest* for other control voltages.

EXTERNAL 24 V SUPPLY

An external 24 V power supply can be used for the logic inputs. In this case, the +24 terminal on the drive controller is not used. Figure 10 shows the wiring diagram when an external supply is used.

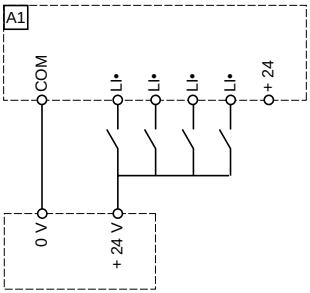


Figure 10: External Supply Wiring Diagram

FAULT RELAY

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

Drive controller reset after a fault is accomplished either by cycling power, allowing the red LED to turn off, or automatically after certain faults, if automatic restart is selected. For further explanation of automatic restart, refer to the instruction bulletin for the keypad display, VVDED397047US.

AVAILABLE TORQUE

Continuous duty:

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

Operation in overspeed:

- In overspeed operation, the voltage no longer increases with the frequency, resulting in reduced induction in the motor which results in a loss of torque. Consult the motor manufacturer to ensure that the motor can operate in overspeed.
- For a special motor, the nominal frequency and the maximum frequency can be adjusted between 40 and 500 Hz using the keypad display, or commissioning software.

⚠ CAUTION

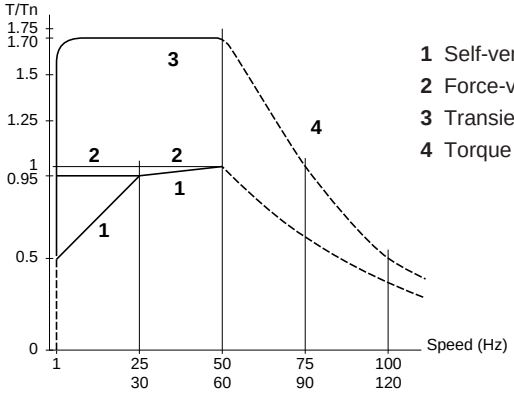
MACHINERY OVERSPEED

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 transient current that the drive controller can deliver: 200% of the nominal motor torque for 2 seconds, and 170% for 60 seconds.

Figure 11 on page 36 shows the typical torque characteristics of the ATV58 *TRX* Type N drive controller.



1 Self-ventilated motor, continuous duty
2 Force-ventilated motor, contiunous duty
3 Transient overtorque for 60 seconds maximum
4 Torque in overspeed at constant power

Figure 11: Typical Torque Characteristics

FACTORY SETTINGS

The ATV58 *TRX* Type N drive controller is preset for constant torque applications. Table 21 lists the factory settings.

Table 21: Factory Settings

Function	Setting
Display	Reference frequency displayed if keypad is present
Base frequency	50/60 Hz [1]
Motor voltage	230 V or 400/460 V, depending on model. See Figure 12 on page 38.
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
Macroconfiguration	Material handling
Control type	2-wire control
Logic inputs	2 run directions LI1, LI2 4 preset speeds LI3, LI4: LSP + reference, 10 Hz, 15 Hz, HSP

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

Table 21: Factory Settings (Continued)

Function	Setting
Analog inputs	AI1: 0 to +10 V reference AI2: 4 to 20 mA reference Analog inputs set for reference summing
Analog output	Motor frequency
Relay outputs	R1: fault relay (cannot be reassigned) R2: not assigned (can be reassigned)
Switching frequency	4 kHz

START UP

⚠ DANGER

HAZARDOUS VOLTAGE

- Read and understand this bulletin in its entirety before installing or operating ALTIVAR 58 *TRX* drive controllers. Installation, adjustment, repair, and maintenance of the drive controllers must be performed 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.
  - — WAIT THREE MINUTES for the DC bus capacitors to discharge. Then follow the DC bus voltage measurement procedure on page 17 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.

Electrical shock will result in death or serious injury.

Before powering up the drive controller and using the keypad display, set the 50/60 Hz switch to correspond with the incoming power frequency. Unlatch and open the door to access the 50/60 Hz switch on the control

board. If an option card is present, the switch will still be accessible through the card. Set the switch to the position corresponding to the mains frequency.

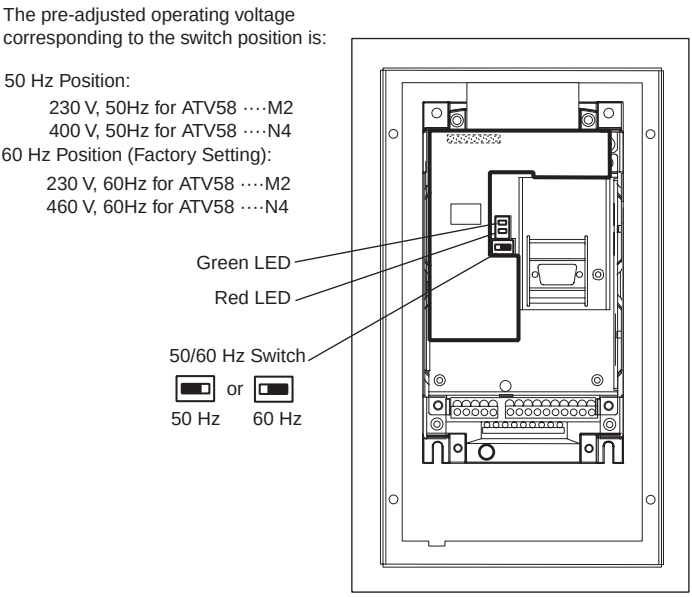


Figure 12: Setting the 50/60 Hz Switch

Several tools are available to aid in starting up the ATV58 *TRX* drive controller:

- Keypad display, VW3A58101U. The drive controller can be ordered with or without the keypad display.
- Commissioning software, VW3A8104, ordered separately

Each of these tools is provided with its own documentation. If your drive controller has an I/O extension card or communication card, also consult the documentation provided with the option.

SECURING THE DOOR

To maintain the seal for the Type 4/4X rating, close both latches on the door.

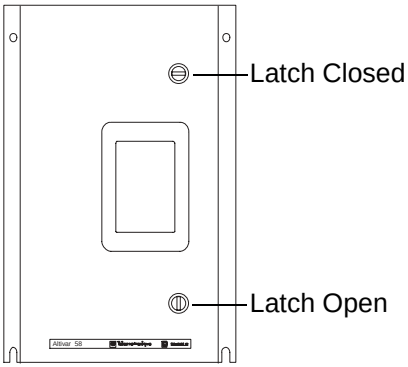


Figure 13: Securing the Door

LIGHT EMITTING DIODES (LEDs)

The LEDs on the front of the drive controller indicate several states as shown in Figure 14 on page 40. The LEDs can be viewed with the door opened.

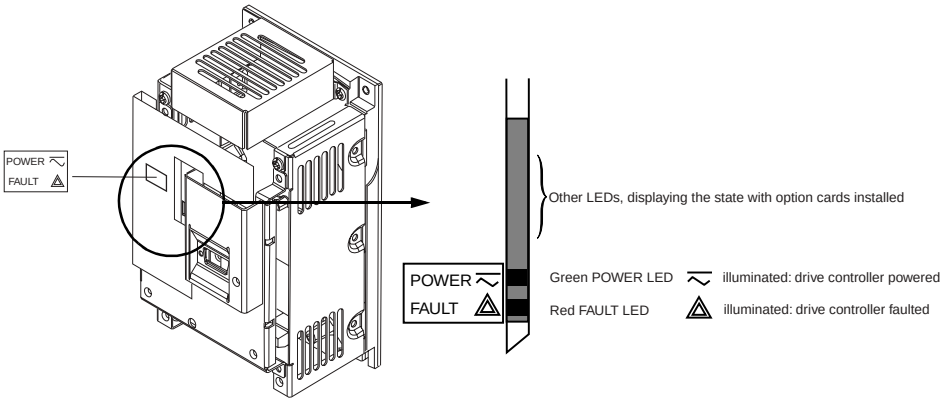


Figure 14: LED States

KEYPAD DISPLAY

Part numbers for ATV58 *TRX* Type N controllers without a keypad display end with “ZU”. A keypad, catalog number VW3A58101U, can be ordered separately and installed directly on the drive controller, or on the door with a remote-mounting kit, catalog number VW3A58837.

Part numbers for ATV58 *TRX* Type N drive controllers provided with a keypad display end with “KU”. A closing plate kit, catalog number VW3A58836, can be ordered separately to maintain the enclosure rating if the keypad is removed from the enclosure door. If the controller is installed outdoors, the keypad must be removed from the enclosure door and replaced with the closing plate.

PREVENTIVE MAINTENANCE

At regular intervals:

- Check the condition and tightness of the connections.
- Ensure that the ventilation is effective and the temperature around the drive controller remains at an acceptable level.
- Remove dust and debris from the drive controller, heat sink, and fans.
- Check fan operation.

TROUBLESHOOTING AND MAINTENANCE

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

After verifying that there is no voltage present on the DC bus (see “Bus Voltage Measurement Procedure” on page 17), check the supply voltage (Procedure 1 below) and the peripheral components (Procedure 2 below).

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

Procedure 1: Checking Supply Voltage

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

1. Perform the bus voltage measurement procedure on page 17.
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. For three-phase drive controllers, remove power and repeat the procedure for L2 and L3, and L1 and L3.
5. When all phases have been measured, remove power and remove leads.

Procedure 2: Checking the Peripheral Equipment

The following equipment may need to be checked. Follow the manufacturers’ procedures when checking this equipment.

1. A protective device such as fuses or a circuit breaker may have opened or 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 conductors or motor while performing such tests.

⚠ CAUTION

EQUIPMENT DAMAGE HAZARD

Do not perform high-potential dielectric tests on circuits while the circuits are connected to the drive controller.

Any circuit requiring high-potential dielectric tests must be disconnected from the drive controller prior to performing the test.

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

Fault Storage

The first fault detected is saved and displayed on the keypad if power is maintained. The drive controller trips and the fault relay opens.

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 will reset the fault if it has been corrected.

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

APPENDIX: OPTIONS AND ACCESSORIES

Table 22 shows the accessories available for ATV58 *TRX* Type N drive controllers and Table 23 contains a repair parts list.

Table 22: ATV58 *TRX* Type N Accessories

Catalog No.	Description
VW3A8104	POWERSUITE™ Test & Commissioning Software on CD for use with Microsoft® WINDOWS 95, 98, and NT™ and Windows CE v3.0 for Pocket PCs
VW3A8106	PC Connection Kit for connecting the PC to an ATV58 *TRX* controller. Kit includes: 1 m cable with RJ45 connectors; RS-232 to RS-485 adapter with RJ45 and DB9 female connectors; RJ45 to DB9 adapter for use with an ATV58 controller; and cable adapter for use with an ATV11 controller.
VW3A8111	Pocket PC Connection Kit for connecting a JORNADA PPC to an ATV58 *TRX* controller. Kit includes: 1/2 m cable with RJ45 connectors, RS-232 to RS-485 adapter with RJ45 and DB9 male connectors; RJ45 to DB9 adapter, cable adapter for use with an ATV11 controller, cable to connect the serial port on the PPC to the DB9 connector on the RS-232 to RS-485 adapter.
VW3A58101U	Keypad Display
VW3A58201U	Analog I/O Option Card
VW3A58202U	Digital I/O Option Card
VW3A58210U	Pump Switching Card
VW3A58253U	General Purpose Option Card
VW3A58301U	FIPIO® Communication Card
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
VW3A58312PU	LONWORKS® to MODBUS DIN Rail Mount Gateway
VW3A58354U	JOHNSON CONTROLS® N2 Communication Card
VW3A58701	DB Transistor for ATV58NU09M2 and U18M2
VW3A58821	Fan Kit for ATV58NU09M2 and U18M2
VW3A58822	Fan Kit for ATV58NU29M2, U41M2, and U18N4 to U41N4
VW3A58823	Fan Kit for ATV58NU54M2, U72M2, and U54N4 to U90N4

Table 22: ATV58 *TRX* Type N Accessories (Continued)

Catalog No.	Description
VW3A58824	Fan Kit for ATV58NU90M2, D12M2, and D12N4 to D23N4
VW3A58836	Closing plate kit for keypad opening on Type N enclosures
VW3A58837	Keypad mounting kit for Type N enclosures, keypad not included
VW3A66711	DB Resistor Kit for ATV58NU09M2, U18M2, U18N4 to U72N4
VW3A66712	DB Resistor Kit for ATV58NU29M2, U41M2, U90N4, D12N4
VW3A66713	DB Resistor Kit for ATV58NU54M2, U72M2

Table 23: Repair Part List for ATV58 *TRX* Type N Controllers

	Description	For Use on Drives	Catalog Number
	ATV58 *TRX* Control Board Kit	ATV58 Type E,F,H, and N	VX4A581U
Top Mounted Fan Kit	These fans are mounted on top of the drive controller inside the enclosure.	Fan Kit for ATV58NU09M2 and U18M2	VW3A58821
		Fan Kit for ATV58NU29M2, U41M2, and U18N4 to U41N4	VW3A58822
		Fan Kit for ATV58NU54M2, U72M2, and U54N4 to U90N4	VW3A58823
		Fan Kit for ATV58NU90M2, D12M2, and D12N4 to D23N4	VW3A58824
Terminals	Removable ATV58 *TRX* 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

Factory repaired ATV58 *TRX* Type N 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 Square D Distributor or Square D Customer Service Representative at 919-266-8600 for availability.

Numerics

A

B

C

D

E

F

G

H

I

K

L

M

O

P

R

S

T

V

W

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