

## Wiring Safety Guide

### ASPYRE DT Power Controllers

Part Number: 2055-8256  
Document Number: 10-37879 Rev. B  
November, 2020



### Safety Information

	CAUTION – Warning or Hazard that needs further explanation than the label on unit can provide. Consult User's Guide for further information.
	Electrical Shock Hazard - Symbol (a lightning bolt in a triangle) precedes an electric shock hazard CAUTION or WARNING safety statement.
	ESD Sensitive product, use proper grounding and handling techniques when installing or servicing product.
	Do not throw in trash, use proper recycling techniques or consult manufacturer for proper disposal.
	Unit is a Listed device per Underwriters Laboratories. It has been investigated to ANSI/UL® 508 standards for Industrial Control Switches and equivalent to CSA C22.2 #14. For more detail search for File E73741 on www.ul.com.
	Unit is compliant with European Union directives. See Declaration of Conformity for further details on Directives and Standards used for Compliance.

### Safety Notes

**WARNING!** To avoid damage to property and equipment, injury and loss of life, adhere to applicable electrical codes and standard wiring practices when installing and operating this product. Failure to do so could result in damage, injury and death.

**WARNING!** All service including inspection, installation, wiring, maintenance, troubleshooting, fuse or other user-serviceable component replacement must be performed only by properly qualified personnel. Service personnel must read this manual before proceeding with work. While service is being performed, other, unqualified personnel should not work on the unit or be allowed in the immediate vicinity.

**WARNING!** When in use, the power controller is connected to dangerous voltages. Do not remove the protective covers without first disconnecting and preventing power from being restored while servicing the unit.

**WARNING!** Electric Shock Hazard: when the power controller has been energized, after shutting off the power, wait at least one minute for internal capacitors to discharge before commencing work that brings you in to contact with power connections or internal components.

**WARNING:** The installation must be protected by electromagnetic circuit breakers or by fuses. The semiconductor fuses located inside the power controller are classified for UL® as supplementary protection for semiconductor devices. They are not approved for branch circuit protection.

**NOTE!** The nominal current is specified for ambient temperatures at or below 40°C. Ensure the application design allows for adequate cooling of each power controller. The power controller must be mounted vertically. The cooling design must prevent air heated by one power controller from causing power controllers mounted above to exceed the ambient operating temperature limit. When power controllers are mounted side by side allow a minimum spacing of 15mm between them.

**NOTE!** Use only copper cables and wires rated for use at 75°C or greater.

**AVERTISSEMENT!** Pour éviter d'endommager la propriété et l'équipement, les blessures et la perte de vie, respecter les codes électriques en vigueur et les pratiques de câblage standard au moment de l'installation et de l'utilisation de ce produit. Dans le cas contraire, cela peut entraîner la mort, des blessures graves ou des dommages.

**AVERTISSEMENT!** Tous les services, y compris l'inspection, l'installation, le câblage, l'entretien, le dépannage, le remplacement de fusibles ou d'autres composants pouvant être réparés par l'utilisateur, doivent être effectués uniquement par un personnel dûment qualifié. Le personnel de service doit lire ce manuel avant d'effectuer tout travail. Pendant que l'entretien est exécuté, tout personnel non qualifié ne doit effectuer de travail sur l'appareil ni se trouver à proximité.

**AVERTISSEMENT!** Au moment de l'utilisation, le régulateur de puissance est connecté à des tensions dangereuses. Ne retirer aucun couvercle de protection sans d'abord débrancher l'appareil et ainsi empêcher l'alimentation d'être rétablie pendant l'entretien.

**AVERTISSEMENT!** Risque de décharges électriques : lorsque le régulateur de puissance est mis sous tension, après avoir été éteint, attendre au moins une minute pour que les condensateurs internes se déchargeant avant de commencer tout travail incluant avec les connexions électriques ou les composants internes.

**AVERTISSEMENT!** L'installation doit être protégée par des disjoncteurs électromagnétiques ou des fusibles. Les fusibles pour semi-conducteurs situés à l'intérieur du régulateur de puissance sont classés UL® comme protection supplémentaire pour les dispositifs pour semi-conducteurs. Ils ne sont pas approuvés pour la protection des circuits de dérivation.

**REMARQUE :** Le courant nominal est précisé pour des températures ambiantes égales ou inférieures à 40°C. S'assurer que la conception de l'application permette le refroidissement adéquat de chaque régulateur de puissance. Le régulateur de puissance doit être monté verticalement. La conception de refroidissement doit empêcher l'air chauffé par le régulateur de puissance de dépasser la limite de température de fonctionnement ambiante de la partie des régulateurs de puissance montés au-dessus. Lorsque les régulateurs de puissance sont montés côté à côté, il faut conserver un espace minimal de 15 mm entre les deux.

**REMARQUE :** N'utiliser que des câbles et des fils en cuivre pour l'utilisation à 75°C ou plus.

### Identifying the Product

The product identification label includes not only the part number but also the voltage and current ratings and auxiliary and fan voltage requirements.

Max. Load Current: 120A	Use Wire rated 75°C,
Max. Load Voltage: 600Vac ~ 50/60Hz	Max Ambient 40°C
Auxiliary Voltage : 540-660Vac ~ 50/60Hz 6VA	For use in Pollution Degree 2 Environment
Fan Voltage : 120 VAC	User Manual: 1917-1409
Second Port : Modbus TCP	
1 Phase 1 Leg Control	



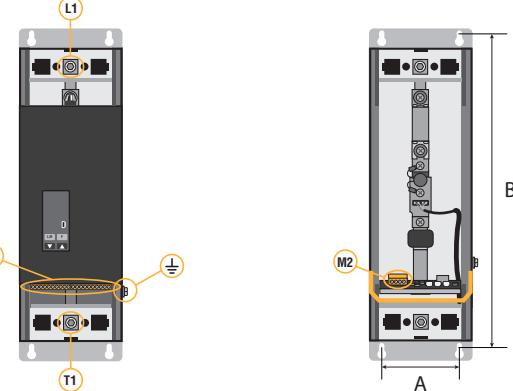
LISTED  
IND. CONT. EQ.  
E73741 2RDS

### Mounting Slots for 60A to 210A, 400V & 600V Models

Model	A	B (no fans)	B (with fans)	Slot Width	Hole Size
DT1...	2.80 in. (71 mm)				
DT2...	6.50 in. (165 mm)	10.06 in. 256 mm	10.24 in. 260 mm	0.2 in. 5 mm	0.35 in. 9 mm
DT3...	5.10 in. (129.5 mm) 2 pl.				

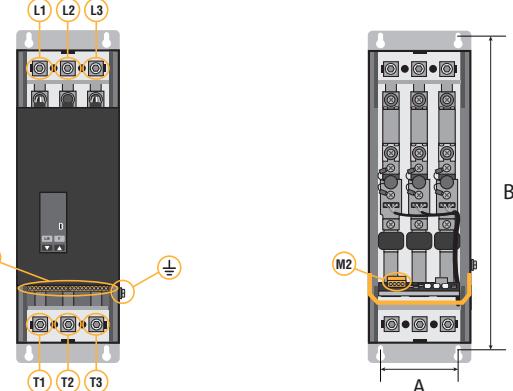
### Connection Locations Single-Phase, 60A to 210A, 690V Models

Top & Bottom Covers Off  
Center Cover Tipped Forward



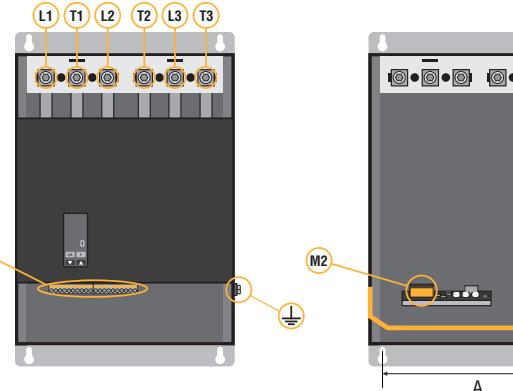
### Connection Locations Three-Phase, 60A & 90A, 690V Models

Top & Bottom Covers Off  
Center Cover Tipped Forward



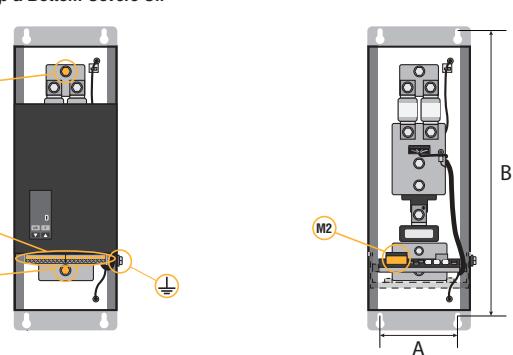
### Connection Locations Three-Phase, 120A to 210A, 690V Models

Top & Bottom Covers Off  
Top & Bottom Covers Off



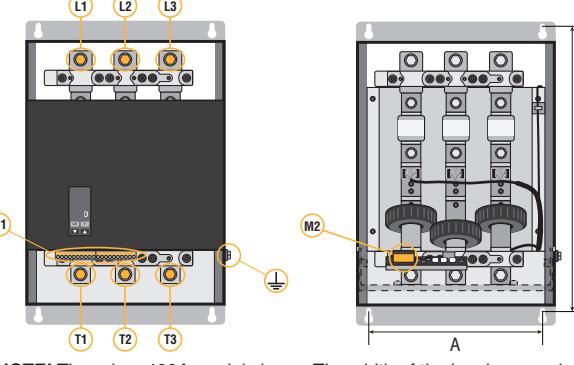
### Connection Locations Single-Phase, 300A to 700A Models

Top & Bottom Covers Off  
Center Cover Tipped Forward



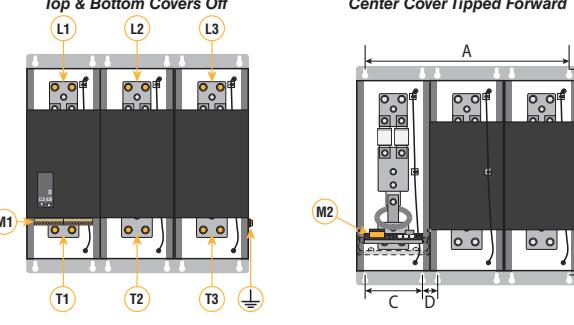
### Connection Locations Three-Phase, 300A to 700A Models

Top & Bottom Covers Off  
Center Cover Tipped Forward



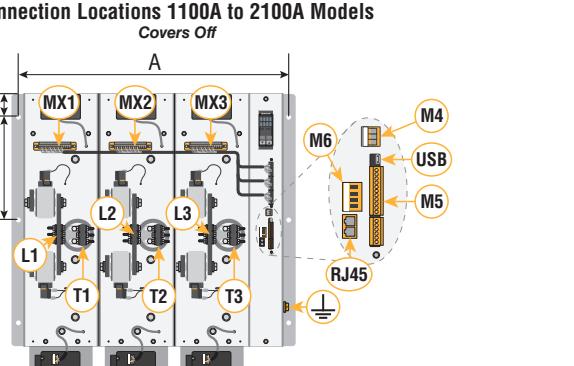
### Connection Locations 800A Models

Top & Bottom Covers Off  
Center Cover Tipped Forward



### Connection Locations 1100A to 2100A Models

Covers Off



**NOTE!** Three-leg model shown. The number of modules varies by model. In all cases the M1 and M2 connectors are in the left-most module and earth ground is on the right.

### Mounting Slots for 60A to 210A, 690V & 300A to 2100A Models

Model	Current (A)	A	B	C	D	Slot Width	Hole Size
DT1...	60 to 90	3.82 in. (97 mm)					
DT1...	120 to 210	16.14 in. 410 mm					
DT2...	120 to 210	8.74 in. (222 mm)					
DT3...	120 to 210	3.82 in. (97 mm)					
DT1...	300 to 700	3.82 in. (97 mm)					
DT2...	300 to 700	8.74 in. (222 mm)					
DT3...	300 to 500	3.82 in. (97 mm)					
DT1...	800	3.82 in. (97 mm)					
DT2...	800	9.25 in. (235 mm)					
DT3...	800	14.61 in. (371 mm)					
DT1...	1100	11.97 in. (304 mm)					
DT2...	1100	19.61 in. (498 mm)					
DT3...	1100	27.24 in. (692 mm)					
DT1...	1400 to 2100	11.97 in. (304 mm)					
DT2...	1400 to 2100	19.61 in. (498 mm)					
DT3...	1400 to 2100	27.24 in. (692 mm)					

### Wiring Instructions

Select cables or bus bar for line power, load connections and earth grounds per National Electric Code or local applicable electric code.

Load wiring for 35A and 40A models requires 90°C rated wire otherwise use 75°C wire.

Connect RS-485 communication common to any analog common terminal.

If using the 10VDC power supply to power dry contact switches connected to digital inputs, connect the digital input common to the analog common.

**! NOTE!** For models that require auxiliary power to be supplied, the auxiliary power must be synchronized with the phase connected to the L1 line power input. The auxiliary voltage is indicated on the product identification label and encoded in the part number as the nominal voltage (character 9).

#### Line Power, Load and Earth Ground Torque

Current	Voltage	Line Power & Load Torque	Earth Ground
35A to 40A	400/600V	26.6 in.-lb. (3.0 Nm)	31 in.-lb. (3.5 Nm)
60A to 120A	400/600V	70.8 in.-lb. (8.0 Nm)	
150A to 210A	400/600V	141.6 in.-lb. (16.0 Nm)	70.8 in.-lb. (8.0 Nm)
60A to 210A	690V	177 in.-lb. (20.0 Nm)	
300A to 2100A	400/600/690V	265 in.-lb. (30 Nm)	177 in.-lb. (20.0 Nm)

**Control Signal Torque**  
4 in.-lb. (0.11 Nm)

#### Control Signal Terminals 35A to 40A Models

M1 Terminal Connections		
M1	Function	Description
10	Analog common 10V & 24V	For analog inputs, retransmit output and RS-485
11	Factory connection	
12	Factory connection	
13	Factory connection	
14	C (common)	
15	Alarm output	NO (normally open contact)
16		NC (normally closed contact)

M2 Terminal Connections		
M2	Function	Description
1	Analog common 10V & 24V	For analog inputs, retransmit output and RS-485
2	Digital input common	Reference to analog common, if necessary
3	Digital input 2	
4	Digital input 1	
5	Analog input 1+	Set point signal input
6	Analog common 10V & 24V	For analog inputs, retransmit output and RS-485
7	+10VDC power supply	For digital inputs and potentiometer
8-9	Not used	

M3 Terminal Connections		
M3	Function	Description
A+	Port 1 Modbus® RTU RS-485	Connect to B+ on USB-to-485 adapter
B-		Connect to A- on USB-to-485 adapter

M4 Terminal Connections		
M4	Function	Description
L1	Auxiliary power input	Line 1
-	Not used	
L2/N	Auxiliary power input	Line 2 or neutral (DT1 models)

M6 Terminal Connections		
M6	Function	Description
17	24VDC power input	Supplemental power for the Ethernet switch and applications that use both analog retransmit and the second communication port
18	Analog common 10V & 24V	For analog inputs, retransmit output and RS-485
19	Analog input 2+	Alternate set point, external feedback or current limit (DT1)
20	Retransmit output+	

#### Control Signal Terminals 60A to 210A, 400V and 600V Models

M1 Terminal Connections (90A to 210A only)		
M1	Function	Description
F1	Power input for fan	+ For DC fans, line or neutral for AC fans - For DC fans, line or neutral for AC fans
F2		

M2 Terminal Connections (DT1 and DT2 only)		
M2	Function	Description
L1	Auxiliary power input	Line 1
-	Not used	
L2/N	Auxiliary power input	Line 2 or neutral on single-phase units

©2020 Watlow Electric Manufacturing Company, all rights reserved.  
Watlow® and ASPYRE® are registered trademarks of Watlow Electric and Manufacturing Company.  
Cooper Bussman® is a registered trademark of Cooper Industries Inc.  
EtherNet/IP™ is a trademark of Open DeviceNet Vendors Association.  
Kanthal® is a registered trademark of Bulten-Kanthal Aktiebolag Joint Stock Company.  
Modbus® is a registered trademark of Schneider Automation Incorporated.  
UL® is a registered trademark of Underwriter's Laboratories, Inc.

#### M3 Terminal Connections

M3	Function	Description
1	Analog common 10V & 24V	For digital inputs and potentiometer
2	Digital input common	Reference to analog common, if necessary
3	Digital input 2	
4	Digital input 1	
5	Analog input 1+	Set point signal input
6	Analog common 10V & 24V	For analog inputs, retransmit output and RS-485
7	+10VDC power supply	For dry contact digital inputs or potentiometers for analog inputs
8	Analog input 2+	Alternate set point, external feedback or current limit (DT1 and DT3)
9	Not used	
10	Retransmit output+	
11	Port 1 Modbus® RTU	Connect to B+ on USB-to-485 adapter
12	RS-485	Connect to A- on USB-to-485 adapter
13	Analog common 10V & 24V	For analog inputs, retransmit output and RS-485
14	C (common)	
15	Alarm output	NO (normally closed contact)
16		NO (normally open contact)

#### M4 Terminal Connections for Modbus® RTU Secondary Communication Option

M4	Function	Description
1	+24VDC input	Supplemental power for the Ethernet switch and applications that use both analog retransmit and the second communication port
2	Analog common 10V & 24V	For 24VDC input and RS-485 common
3-5	Not used	

#### Control Signal Terminals 60A to 210A, 690V & 300A to 800A Models

#### M1 Terminal Connections

M1	Function	Description
1		NO (normally open contact)
2	Alarm output	C (common)
3		NC (normally closed contact)
4	Analog input 2+	Alternate set point, external feedback or current limit (DT1 and DT3)
5	Digital input 2	
6	Digital input 1	
7	Port 1 Modbus® RTU	Connect to B+ on USB-to-485 adapter
8	RS-485*	Connect to A- on USB-to-485 adapter
9	+10VDC power supply	For dry contact or potentiometer inputs
10	Analog common 10V & 24V	For analog inputs, retransmit and RS-485 common
11	Analog common 10V & 24V	Set point signal input
12	Digital input common	Reference to analog common, if necessary
13		
14	Not Used	
15	Power input for fan	+ For DC fans, line or neutral for AC fans - For DC fans, line or neutral for AC fans
16		
17	Not used	
18	Auxiliary power input	Line 1
19	Not used	
20	Auxiliary power input	Line 2 or neutral on single phase units

#### M2 Terminal Connections

M2	Function	Description
1	+24VDC supplemental power for the Ethernet switch and applications that use both analog retransmit and the second communication port (other than Modbus® RTU)	
2	Unused	
3	Retransmit output+	
4	Analog common 10V & 24V	For 24VDC input, retransmit output and RS-485

#### Control Signal Terminals 1100A to 2100A Models

#### Mx Terminal Connections\*

Mx	Function	
1 to 12	Internal connections	
13 & 14	Thermal switch (closed when OK, open with over temperature)	
15 & 16	Power input for fan. See fan voltage on product identification label	

#### Sync Terminal Connections (Single-Phase and Three-Phase, Two-Leg Models Only)

	Function	
1	For single-phase models connect to neutral. For three-phase, two-leg connect to L2.	
2	Connect to either terminal; terminals are internally shorted.	

#### M5 Terminal Connections

M5	Function	Description



<tbl\_r cells