

MOTOR CONTROL TECHNOLOGY PRODUCT CATALOGUE

THREE PHASE DRIVES: TT/X RANGE



Founded over 110 years ago, T-T Electric is a world-class supplier of top-quality industrial DC motors and AC motors. Pioneers in the industry, we are an experienced and established manufacturer of a comprehensive and cost-effective range of highly-reliable drive products. They are used all around the world in the toughest of application environments and in all industrial segments.

T-T Electric is committed to a working partnership with our customers. We focus on complete and innovative solutions together and provide extensive support services. These include diagnostics and maintenance on site as well as full overhaul services in our own repair facilities. We undertake to provide these services for our products as well as all other makes of electrical rotating machines.

Driven by customer demand, T-T Electric is continually researching product excellence and manufacturing process perfection. The flexible product design ensures easy adaptation to the customer's requirements. This, combined with unequalled short delivery times, make T-T Electric a reference within industry.

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DC Motor Control Technology:

Increase your productivity, save energy and reduce downtime.

With an extensive range of DC motor control products, you will find an answer to your industrial automation questions.

Your Industry - Our Experience.

We've used our renowned industrial automation experience to design a range of DC motor controllers which provide you with solutions to the most demanding motor control applications.

It's now easier than ever to design new DC motor control systems or improve the performance of an existing application by retrofitting with the latest DC technology.

Save with Compact Designs and Ex-Stock Delivery.

You can save cabinet space in new control systems, or easily upgrade an existing DC motor application. Compact design comes as standard.

Reduce your downtime by relying on our ex-stock delivery. With a global network of partners and all products built for stock, you can quickly get your business moving again.

Take control of the most demanding motor control applications.

The TT/X DC drives give a fast controlled response over the full speed range.



The TT/X range



5 - 50kW
12 - 123AMPS



65 - 145kW
155 - 330AMPS

The 4Q TT/X can motor and brake in forward and reverse and regenerate energy into the mains supply when braking.

All models include 40 character alpha-numeric back-lit display, full set of centre winding blocks and a field weakener for extended speed range. A high quality product from a world beating company.

Available in both 2Q and 4Q versions the range comprises 5 very compact chassis sizes with models rated from 12 to 2250 Amps.

Key Features:

- Friendly easy-to-use menu structure with descriptive parameter names.
- Extremely flexible block diagram including unique "Configuration Checker", detects conflicts in user programmed configurations.
- Failsafe automatic "Revert to AVF" on tach feedback failure.
- A choice of two drive configuration and monitoring packages.
 - TT Pilot. Free with TT/X.
 - Pilot+. Free and can be upgraded to signal flow diagram.
- Ultra compact sizes offering significant panel space savings over other manufacturers.
- Programming menu is designed for rapid travel to desired parameter using ergonomically designed keys.



185 - 265kW
430 - 630AMPS



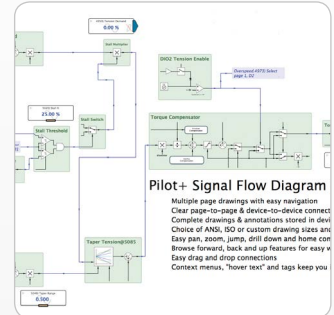
275 - 440kW
650 - 1050AMPS



520 - 980kW
1250 - 2250AMPS

- Five feedback transducer options as standard.
- Non-volatile trip alarm memory, even after power-down.
- Real language parameter description eliminates need for look-up tables.
- Built-in "Oscilloscope" output for full parameter monitoring.
- Three fully independent, user programmable drive configurations.
- Full suite of centre winding Apps included.
- Extensive, multi-function programmable I/O, with over 36 digital and analogue input/output combinations.
- Built-in system application blocks with descriptive connection points.
- Unique electronic regenerative stopping facility on selected 2Q models.
- In-depth fault monitoring and comprehensive system alarms.
- Serial communications to allow off-site programming and remote diagnostics.
- In-depth diagnostic facility available from on-board display and "in-built meter".
- On board fully controlled field with five operating modes.
- Easy to use product manual with display graphics and block diagrams.
- Full suite of built-in encoder functions as standard.
- Large 40 character backlit alphanumeric LCD display.
- All TT/X models are compatible with drive.web, to provide robust programmable peer control for drives and systems.

SPECIFICATION



Ratings

POWER CONFIGURATION

- TTX Four Quadrant Regenerative
- TT Two Quadrant Non-Regenerative (some TT models have electronic regenerative stopping facility)
- Fully controlled variable field supply

ARMATURE VOLTAGE

- $V_{armature} = V_{ac} \times 1.2$

ARMATURE CURRENT RATINGS (ADC)

- 12, 24, 36, 51, 72, 99, 123, 155, 205, 270, 330, 430, 530, 630, 650, 750, 850, 950, 1050*, 1250, 1450, 1650, 1850, 2050, 2250*
- Overload 150% for 25 seconds
- *No overload

FIELD CURRENT

- 8A (12-123A ratings)
- 16A (155-330A ratings)
- 32A (430-630A ratings)
- 64A (1250-2250A ratings)

FIELD VOLTAGE

- $V_{field} = 0 \text{ to } 0.9 \times \text{Auxiliary AC Supply}$

AC SUPPLY VOLTAGE (VAC)

- Main 3 phase 50-60Hz:**
- 12 to 480Vac +/- 15% for armature power
 - 600/690Vac options for 650A-2250A

Auxiliary 3 phase 50-60Hz:

- 100 to 480Vac +/- 15% for field power
- 600/690Vac options for 650A-2250A

Control 1 phase 50-60Hz:

- 110 to 240Vac +/- 10% for control power

Protection

- Interline device networks
- High energy MOV's
- Instantaneous over-current
- Field failure and over-current
- Motor over-temperature
- Thyristor stack over-temperature
- Mains supply phase loss
- Mains synchronisation loss
- Armature over-volts
- Speed feedback failure
- Stall protection
- Standstill logic
- Thyristor 'trigger' failure
- Digital output short circuit

Inputs/Outputs

ANALOGUE INPUTS

- 8 total (resolution 2.5mV+sign)
- All configurable
- All have programmable thresholds and 4 voltage ranges
- +/- 5/10/20/30V
- All inputs are over voltage protected and can also be utilised as digital inputs

ANALOGUE OUTPUTS

- 4 Total (resolution 2.5mV+sign)
- 1 armature current output
- 3 configurable
- All outputs are short circuit protected

DIGITAL INPUTS

- 17 total
- All configurable

DIGITAL OUTPUTS

- 7 Total (24V logic 350mA total)
- Short circuit protected
- Over temp and over voltage protected
- All configurable

Standard software functions

- Full suite of centre winding macros
- Motorised pot simulator with memory
- 2x PIDs (undedicated)
- 2x Summers (undedicated)
- 2x Filters (undedicated)
- Delay timer
- Current Profiling
- Spindle Orientation
- Jog/Crawl functions
- Dual motor swap
- Latch
- Linear or S ramp
- Slack take up
- Batch counter
- Draw control
- Auto self-tune current loop
- 3 user programmable drive configurations

Alarm Status

- First fault latched and automatically displayed.
- Fault automatically saved at power off

Monitoring

- All analogue input voltages
- All digital input states
- All analogue output voltages
- All digital output states
- Tachogenerator voltage
- Motor armature current (amps)
- Motor field current (amps)
- Motor armature volts
- Output power
- AC supply volts

Field configurations

- Fixed current
- Fixed voltage
- Field weakening
- Delayed quenching
- Standby field value
- Field economy

Environment

- Ambient operating temperature
- 0-40°C (2050A 2250A 35°C)
- 25 to +55°C storage

Steady state accuracy

- 0.01% Encoder feedback with digital reference.
- 0.1% Analogue tachogenerator feedback
- 2% Armature voltage feedback
- 0.01% Encoder + tach, encoder + AVF or encoder only feedback
- Maximum encoder frequency 100KHz

Standards

- CE marked to EN50178**
- (low voltage directive)

EN50082-2:1995

- Immunity industrial environment

EN50082-1:1997

- Immunity residential commercial and light industry

EN50081-2:1993

- Emissions industrial environment (EN55011 Class A)

EN50081-1:1992

- Emissions industrial environment (EN55022 Class B)

- UL and cUL listed 12-630Amps
- UL and cUL pending 650-2250Amps

TT/X configuration and monitoring tools

Minimise your setup and commissioning time.
A choice of 2 drive configuration and monitoring packages.

PRODUCT NAME

TT PILOT

DESCRIPTION

The PC running the TT PILOT software is connected to the drive via the PC's standard serial port. The package is designed for ease of use and provides a clear, defined and understandable method for accessing all levels of the drives extensive built in functionality.

Unique 'Configuration Checker' automatically scans for user programmed connection faults and highlights the conflicts. Tile and zoom facility allows the user to view and arrange any number of screens simultaneously.

Diagnostic monitoring in engineering units (volts, amps, Kw, RPM, Hz) and percentages for all terminals and block outputs.

Extensive colour dynamics to assist in the detection of important conditions.

PRODUCT NAME

PILOT+

DESCRIPTION

Pilot+ is a sophisticated software tool that can be used to configure the TT/X as an alternative to TT PILOT.

Pilot+ can be upgraded for a small cost to include a signal flow diagram (SFD) graphical package. This allows the user configured internal block diagram of the TT/X system to be represented as a block diagram on screen and changed by drag and drop connections from PIN to PIN.

When used in conjunction with the drive.web distributed control products the Pilot+ software can produce an entire configuration diagram of a multiple drive system.

drive.web

All TT/X models are compatible with drive.web. The drive.web distributed control technology uses Ethernet and powerful graphical tools to provide robust, Programmable Peer Control (PPC) for drives and systems.

The drive.web technology is infinitely scalable and cost effective for systems of any size or complexity. For typical motor control systems, drive.web beats using any PLC on cost, performance and ease of use.



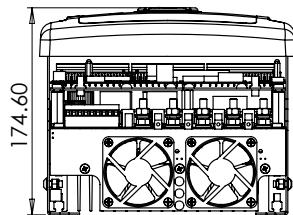
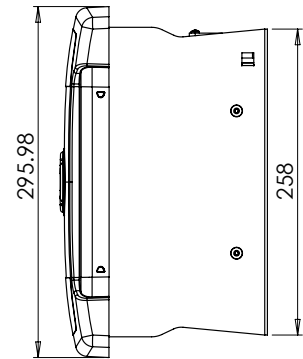
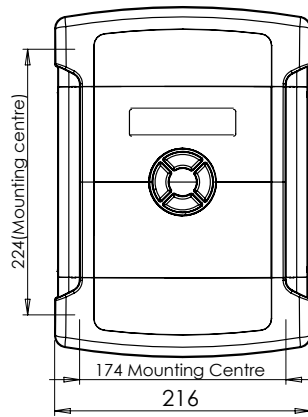


DESCRIPTION

The TT/X DC motor controller uses closed loop control of armature current and feedback voltage to give precise control of motor torque and speed. The unit also controls the motor excitation field. The closed loop parameters are programmable by the user and a wealth of inputs and outputs are provided to allow very complex motion control processes to be achieved.

PRODUCT NAME

TT/X12-123



RATINGS & DIMENSIONS

TT 2 QUADRANT TT/X 4 QUADRANT	KW @ 460v	HP @ 460v	ARMATURE CURRENT DC AMPS	FIELD AMPS
TT* & TTX12	5	6.6	12	8
TT* & TTX24	10	13.3	24	8
TT* & TTX36	15	20	36	8
TT* & TTX51	20	26.6	51	8
TT* & TTX72	30	40	72	8
TT* & TTX99	40	53.3	99	8
TT* & TTX123	50	66.6	123	8

FRAME SIZE

H	296 mm
W	216 mm
D	175 mm

SHIPPING WEIGHT

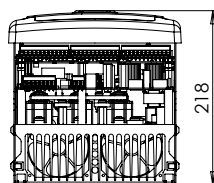
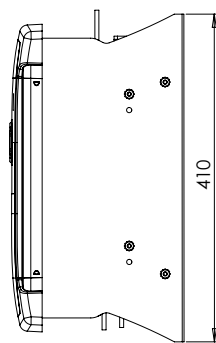
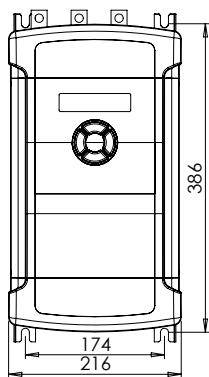
8kg

* TT model has regen stopping facility



PRODUCT NAME

TT/X155-330



RATINGS & DIMENSIONS

TT 2 QUADRANT TT/X 4 QUADRANT	KW @ 460v	HP @ 460v	ARMATURE CURRENT DC AMPS	FIELD AMPS
TT & TTX155	65	90	155	16
TT & TTX205	85	115	205	16
TT & TTX270	115	155	270	16
TT* & TTX330	145	190	330	16

* TT model has regen stopping facility

FRAME SIZE

H 410 mm

W 216 mm

D 218 mm

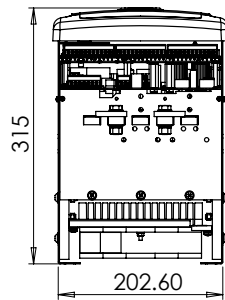
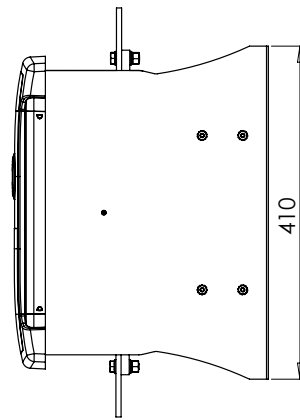
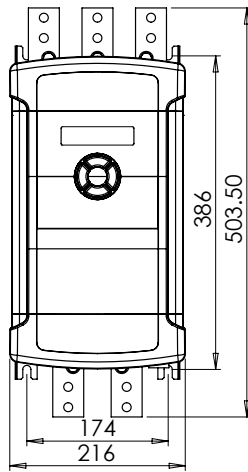
SHIPPING WEIGHT

15kg



PRODUCT NAME

TT/X430-630



RATINGS & DIMENSIONS

TT 2 QUADRANT TT/X 4 QUADRANT	KW @ 460v	HP @ 460v	ARMATURE CURRENT DC AMPS	FIELD AMPS
TT & TT/X430	185	250	430	32
TT* & TT/X530	225	300	530	32
TT only 630	265	350	630	32

* TT model has regen stopping facility
50 Amp field option

FRAME SIZE

H	504 mm
W	216 mm
D	315 mm

SHIPPING
WEIGHT

24kg

DESCRIPTION

These models have all the functionality of the smaller units, but with added flexibility on the supply voltage and input port.

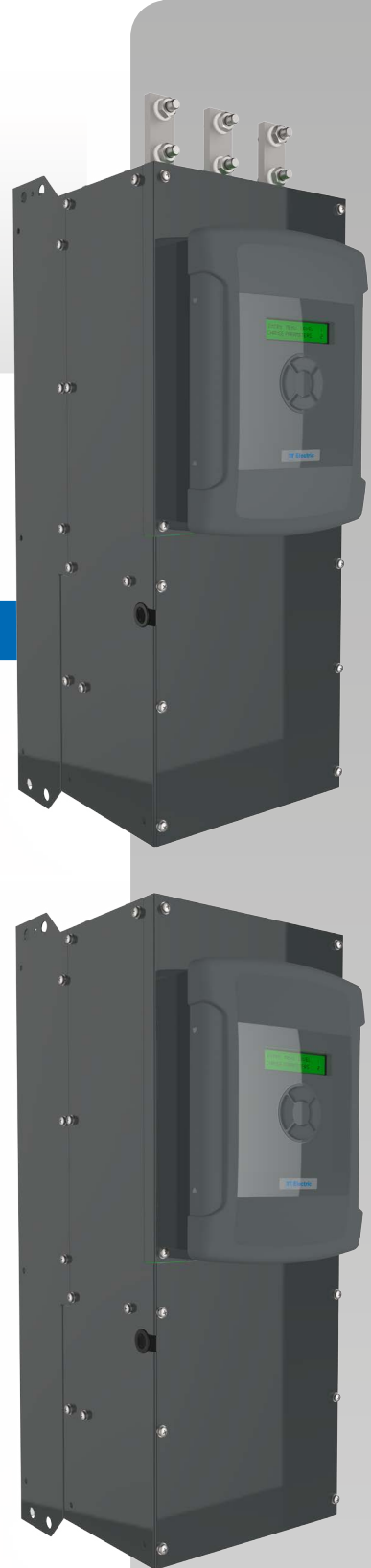
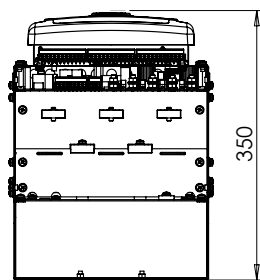
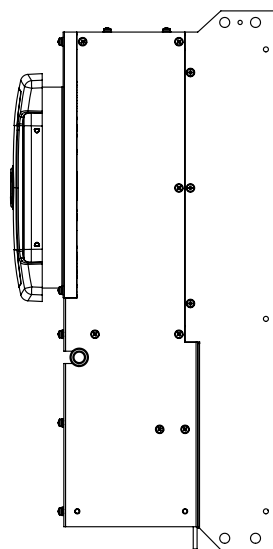
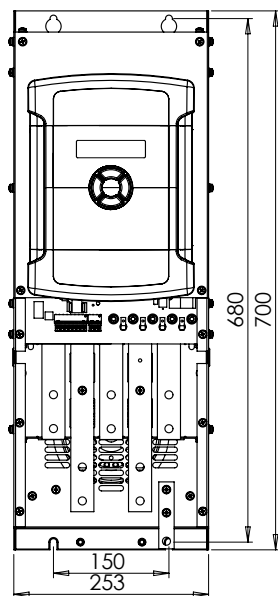
As well as standard voltages up to 480V AC, they have the option of being supplied as MV units that are able to accept voltages of up to 600 volts and HV units that are able to

accept voltages up to 690 volts for motors with armatures of up to 750 volts DC.

All models are also available with the high current 3 phase supply terminals in standard top entry, or bottom entry as an option.

PRODUCT NAME

TT/X650-1050



RATINGS & DIMENSIONS

TT 2 QUADRANT TT/X 4 QUADRANT	KW @ 460v	HP @ 460v	ARMATURE CURRENT DC AMPS	FIELD AMPS
TT & TTX650	275	370	650	32
TT & TTX750	315	425	750	32
TT & TTX850	360	485	850	32
TT* & TTX950	400	540	950	32
TT* & TTX1050**	440	590	1050	32

FRAME SIZE

H	700 mm
W	253 mm
D	350 mm

SHIPPING WEIGHT

45kg

* TT model has regen stopping facility

** TTX1050 no overload

50 Amp field option

Venting kit for units
TT/X650-1050

The venting kit comprises two steel ducts which are designed to telescope together. There is also a protective cowl for mounting on the enclosure roof. The duct length from the top of the drive is adjustable between 270mm to 538mm.



DESCRIPTION

These models have all the functionality of the smaller units, but with added flexibility on the supply voltage and input port location.

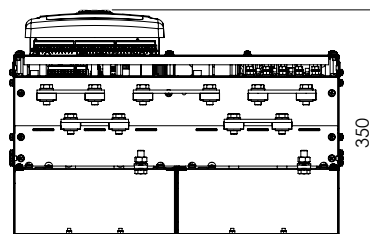
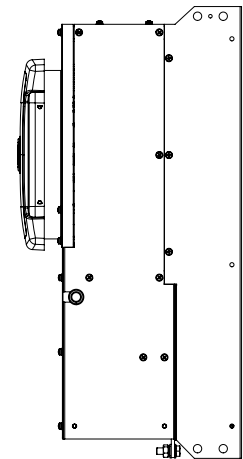
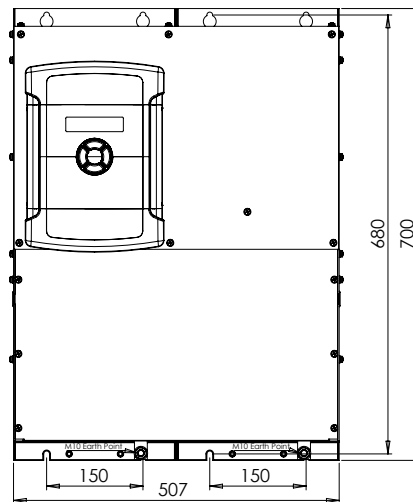
As well as standard voltages up to 480V AC, they have the option of being supplied as MV units that are able to accept voltages of up to 600 volts and as

HV units that are able to accept voltages up to 690 volts for motors with armatures of up to 750 volts DC.

All models are also available with the high current 3 phase supply terminals in standard top entry, or bottom entry as an option.

PRODUCT NAME

TT/X1250-2250



Venting kit for units TT/X1250-2250

The venting kit comprises two steel ducts which are designed to telescope together. There is also a protective cowl for mounting on the enclosure roof. The duct length from the top of the drive is adjustable between 270mm to 538mm.

RATINGS & DIMENSIONS

TT 2 QUADRANT TT/X 4 QUADRANT	KW @ 460v	HP @ 460v	ARMATURE CURRENT DC AMPS	FIELD AMPS
TT & TTX1250	520	700	1250	64
TT & TTX1450	600	810	1450	64
TT* & TTX1650	700	940	1650	64
TT* & TTX1850	800	1080	1850	64
TT* & TTX2050	900	1200	2050	64
TT* & TTX2250**	980	1320	2250	64

FRAME SIZE

H 700 mm (755 mm top entry)
W 507 mm
D 350 mm

SHIPPING WEIGHT

90kg

* TT model has regen stopping facility

** TTX2250 no overload

TTXD

DESCRIPTION

Thyristor Stack Controller

The TTXD is used for controlling external 3 phase thyristor stacks for DC motors, and possesses all the functionality of the TT/X range. It is in the same package as the TT/X 5 - 50 models.

The TTXD provides gate drive pulses for driving user supplied pulse transformers with primary pulse current up to 1.5 Amp.

There are terminals to accept an externally generated isolated armature current signal, field signal, thermal heatsink sensor switch, and high voltage armature voltage feedback.

The unit also provides a +24v supply for the gate drive pulse transformers that is short circuit protected.

The following stack configurations can be driven by the TTXD:

- 1) 6 pulse 2 Quadrant bridge (6 thyristors), or 2 bridges in parallel (12 thyristors).
- 2) 6 pulse 4 Quadrant regen anti-parallel bridge (12 thyristors).

Extra stacks can be used in parallel within the gate drive capability.

All customer control terminals are the plug-in screw terminal variety.

The TTXD can be used with up to 690v AC on its 3 phase auxiliary supply inputs (EL1/2/3). The external stacks can be of higher voltages if required.

The armature voltage inputs can monitor up to +/-1000 Volts DC.



There is an integral motor field bridge with independent single phase AC supply inputs (EF2/3) for controlling fields up to 32 Amps. The internal field bridge supply input voltage rating is 480v AC.

Provision is made for providing an external field feedback signal and controlling an external field with user supplied primary gate pulse transformer drivers.

There is a pulse transformer unit available at extra cost for users who prefer not to supply their own components. It contains all the external interface components required to combine the TTXD with the thyristor stack and its associated Accts (AC current transformers). It includes 12 pulse transformer networks for 2 or 4 quadrant bridges, an armature burden rectifier network, and 2 pulse transformer networks for an external field bridge. The unit is designed to be mounted on a DIN rail and all the interface connections are via screw terminals.

TT RANGE, DIGITAL THREE PHASE 2Q DRIVE WITH INTEGRAL FIELD WEAKENER

TT12



5KW 12A THIS MODEL HAS REGENERATIVE STOPPING CAPABILITY AS STANDARD

Controller	PL5
Line reactor	LR48
Aux Semiconductor Fuse, 3 required 6 x 32	CH00620A
Aux Fuseholder, 3 required 6 x 32	CP102071
DIN Rail Clip for holder, 6 required	FE101969
Main Semiconductor Fuse, 3 required 6 x 32	CH00612A
Main Fuseholder, 3 required 6 x 32	CP102071
Pot kit including graduated dial & knob	POTKIT

TT24



10KW 24A THIS MODEL HAS REGENERATIVE STOPPING CAPABILITY AS STANDARD

Controller	PL10
Line reactor	LR48
Aux Semiconductor Fuse, 3 required 6 x 32	CH00620A
Aux Fuseholder, 3 required 6 x 32	CP102071
DIN Rail Clip for Aux Fuseholder, 3 required	FE101969
Main Semiconductor Fuse, 3 required 14 x 51	CH00740A
Main Fuseholder, 3 required 14 x 51	CP102053
Pot kit including graduated dial & knob	POTKIT

TT36



15KW 36A THIS MODEL HAS REGENERATIVE STOPPING CAPABILITY AS STANDARD

Controller	PL15
Line reactor	LR48
Aux Semiconductor Fuse, 3 required 6 x 32	CH00620A
Aux Fuseholder, 3 required 6 x 32	CP102071
DIN Rail Clip for Aux Fuseholder, 3 required	FE101969
Main Semiconductor Fuse, 3 required 14 x 51	CH00740A
Main Fuseholder, 3 required 14 x 51	CP102053
Pot kit including graduated dial & knob	POTKIT

TT51



20KW 51A THIS MODEL HAS REGENERATIVE STOPPING CAPABILITY AS STANDARD

Controller	PL20
Line reactor	LR48
Aux Semiconductor Fuse, 3 required 6 x 32	CH00620A
Aux Fuseholder, 3 required 6 x 32	CP102071
DIN Rail Clip for Aux Fuseholder, 3 required	FE101969
Main Semiconductor Fuse, 3 required Size 000	CH00850A
Main Fuseholder, 3 required Size 000	CP102054
Pot kit including graduated dial & knob	POTKIT

TT72



30KW 72A THIS MODEL HAS REGENERATIVE STOPPING CAPABILITY AS STANDARD

Controller	PL30
Line reactor	LR120
Aux Semiconductor Fuse, 3 required 6 x 32	CH00620A
Aux Fuseholder, 3 required 6 x 32	CP102071
DIN Rail Clip for Aux Fuseholder, 3 required	FE101969
Main Semiconductor Fuse, 3 required Size 000	CH00880A
Main Fuseholder, 3 required Size 000	CP102054
Pot kit including graduated dial & knob	POTKIT

TT99



40KW 99A THIS MODEL HAS REGENERATIVE STOPPING CAPABILITY AS STANDARD

Controller	PL40
Line reactor	LR120
Aux Semiconductor Fuse, 3 required 6 x 32	CH00620A
Aux Fuseholder, 3 required 6 x 32	CP102071
DIN Rail Clip for Aux Fuseholder, 3 required	FE101969
Main Semiconductor Fuse, 3 required Size 000	CH008100
Main Fuseholder, 3 required Size 000	CP102054
Pot kit including graduated dial & knob	POTKIT

Please refer to website for further information or product technical manual for full specification.

PRODUCT NAME

PART

PART NO.

TT123



50KW 123A THIS MODEL HAS REGENERATIVE STOPPING CAPABILITY AS STANDARD

Controller	PL50
Line reactor	LR120
Aux Semiconductor Fuse, 3 required 6 x 32	CH00620A
Aux Fuseholder, 3 required 6 x 32	CP102071
DIN Rail Clip for Aux Fuseholder, 3 required	FE101969
Main Semiconductor Fuse, 3 required Size 000	CH008125
Main Fuseholder, 3 required Size 000	CP102054
Pot kit including graduated dial & knob	POTKIT

TT155



65KW 155A

Controller	PL65
Line reactor	LR330
Aux Semiconductor Fuse, 3 required 6 x 32	CH00620A
Aux Fuseholder, 3 required 6 x 32	CP102071
DIN Rail Clip for Aux Fuseholder, 3 required	FE101969
Main Semiconductor Fuse, 3 required Size 000	CH008160
Main Fuseholder, 3 required Size 000	CP102054
Pot kit including graduated dial & knob	POTKIT

TT205



85KW 205A

Controller	PL85
Line reactor	LR330
Aux Semiconductor Fuse, 3 required 6 x 32	CH00620A
Aux Fuseholder, 3 required 6 x 32	CP102071
DIN Rail Clip for Aux Fuseholder, 3 required	FE101969
Main Semiconductor Fuse, 3 required Size 1	CH009250
Main 3 pole Fuseholder Size 1	CP102055
Pot kit including graduated dial & knob	POTKIT

TT270



115KW 270A

Controller	PL115
Line reactor	LR330
Aux Semiconductor Fuse, 3 required 6 x 32	CH00620A
Aux Fuseholder, 3 required 6 x 32	CP102071
DIN Rail Clip for Aux Fuseholder, 3 required	FE101969
Main Semiconductor Fuse, 3 required Size 1	CH009250
Main 3 pole Fuseholder Size 1	CP102055
Pot kit including graduated dial & knob	POTKIT

TT330



145KW 330A THIS MODEL HAS REGENERATIVE STOPPING CAPABILITY AS STANDARD

Controller	PL145
Line reactor	LR330
Aux Semiconductor Fuse, 3 required 6 x 32	CH00620A
Aux Fuseholder, 3 required 6 x 32	CP102071
DIN Rail Clip for Aux Fuseholder, 3 required	FE101969
Main Semiconductor Fuse, 3 required Size 3	CH010550
Main 3 pole Fuseholder Size 3	CP102233
Pot kit including graduated dial & knob	POTKIT

TT430



185KW 430A

Controller	PL185
50 Amp option on field output	
Line reactor	LR530
Aux Semiconductor Fuse Size 000, 3 required	CH00850A
Aux Fuseholder Size 000, 3 required	CP102054
Main Semiconductor Fuse, 3 required Size 3	CH010550
Main 3 pole Fuseholder Size 3	CP102233
Pot kit including graduated dial & knob	POTKIT

PRODUCT NAME

PART

PART NO.

TT530



225KW 530A THIS MODEL HAS REGENERATIVE STOPPING CAPABILITY AS STANDARD	
Controller	PL225
50 Amp option on field output	
Line reactor	LR530
Aux Semiconductor Fuse Size 000, 3 required	CH00850A
Aux Fuseholder Size 000, 3 required	CP102054
Main Semiconductor Fuse, 3 required Size 3	CH010550
Main 3 pole Fuseholder Size 3	CP102233
Pot kit including graduated dial & knob	POTKIT

TT630



265KW 630A	
Controller	PL265
50 Amp option on field output	
Line reactor	LR630
Aux Semiconductor Fuse Size 000, 3 required	CH00850A
Aux Fuseholder Size 000, 3 required	CP102054
Main Semiconductor Fuse, 3 required Size 3	CH010700
Main 3 pole Fuseholder Size 3	CP102233
Pot kit including graduated dial & knob	POTKIT

TT650



275KW 650A		
Options	Controller	PL275
TE - top entry (standard)	Line Reactor	LR650
BE - bottom entry (no cost option)	Main Semiconductor Fuse, 3 required	CH103301
50 Amp field (extra cost option)	Aux Semiconductor Fuse, 3 required	CH103361
MV - 600VAC (extra cost option)	Aux Fuseholder, 3 required	CP103371
HV - 690VAC (extra cost option)	Pot kit inc. graduated dial and knob	POTKIT

TT750



315KW 750A		
Options	Controller	PL315
TE - top entry (standard)	Line Reactor	LR750
BE - bottom entry (no cost option)	Main Semiconductor Fuse, 3 required	CH103302
50 Amp field (extra cost option)	Aux Semiconductor Fuse, 3 required	CH103361
MV - 600VAC (extra cost option)	Aux Fuseholder, 3 required	CP103371
HV - 690VAC (extra cost option)	Pot kit inc. graduated dial and knob	POTKIT

TT850



360KW 850A		
Options	Controller	PL360
TE - top entry (standard)	Line Reactor	LR850
BE - bottom entry (no cost option)	Main Semiconductor Fuse, 3 required	CH103303
50 Amp field (extra cost option)	Aux Semiconductor Fuse, 3 required	CH103361
MV - 600VAC (extra cost option)	Aux Fuseholder, 3 required	CP103371
HV - 690VAC (extra cost option)	Pot kit inc. graduated dial and knob	POTKIT

TT950



400KW 950A THIS MODEL HAS REGENERATIVE STOPPING CAPABILITY AS STANDARD		
Options	Controller	PL400
TE - top entry (standard)	Line Reactor	LR950
BE - bottom entry (no cost option)	Main Semiconductor Fuse, 3 required	CH103304
50 Amp field (extra cost option)	Aux Semiconductor Fuse, 3 required	CH103361
MV - 600VAC (extra cost option)	Aux Fuseholder, 3 required	CP103371
HV - 690VAC (extra cost option)	Pot kit inc. graduated dial and knob	POTKIT

TT1050



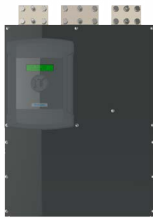
440KW 1050A THIS MODEL HAS REGENERATIVE STOPPING CAPABILITY AS STANDARD		
Options	Controller	PL440
TE - top entry (standard)	Line Reactor	LR1050
BE - bottom entry (no cost option)	Main Semiconductor Fuse, 3 required	CH103305
50 Amp field (extra cost option)	Aux Semiconductor Fuse, 3 required	CH103361
MV - 600VAC (extra cost option)	Aux Fuseholder, 3 required	CP103371
HV - 690VAC (extra cost option)	Pot kit inc. graduated dial and knob	POTKIT

Please refer to website for further information or product technical manual for full specification.

PRODUCT NAME

PART

TT1250



520KW 1250A

Options
 TE - top entry (standard)
 BE - bottom entry (no cost option)
 MV - 600VAC (extra cost option)
 HV - 690VAC (extra cost option)
 Refer to supplier for information

Controller	PL520
Line Reactor	LR1250
Main Semiconductor Fuse, 3 required	CH103306
Aux Semiconductor Fuse, 3 required	CH103363
Aux Fuseholder, 3 required	CP103373
Pot kit inc. graduated dial and knob	POTKIT

TT1450

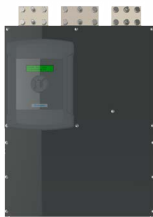


600KW 1450A

Options
 TE - top entry (standard)
 BE - bottom entry (no cost option)
 MV - 600VAC (extra cost option)
 HV - 690VAC (extra cost option)
 Refer to supplier for information

Controller	PL600
Line Reactor	LR1450
Main Semiconductor Fuse, 3 required	CH103307
Aux Semiconductor Fuse, 3 required	CH103363
Aux Fuseholder, 3 required	CP103373
Pot kit inc. graduated dial and knob	POTKIT

TT1650

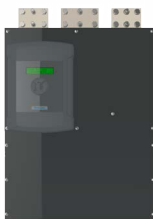


700KW 1650A THIS MODEL HAS REGENERATIVE STOPPING CAPABILITY AS STANDARD

Options
 TE - top entry (standard)
 BE - bottom entry (no cost option)
 MV - 600VAC (extra cost option)
 HV - 690VAC (extra cost option)
 Refer to supplier for information

Controller	PL700
Line Reactor	LR1650
Main Semiconductor Fuse, 3 required	CH103308
Aux Semiconductor Fuse, 3 required	CH103363
Aux Fuseholder, 3 required	CP103373
Pot kit inc. graduated dial and knob	POTKIT

TT1850

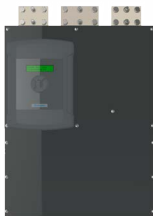


800KW 1850A THIS MODEL HAS REGENERATIVE STOPPING CAPABILITY AS STANDARD

Options
 TE - top entry (standard)
 BE - bottom entry (no cost option)
 MV - 600VAC (extra cost option)
 HV - 690VAC (extra cost option)
 Refer to supplier for information

Controller	PL800
Line Reactor	LR1850
Main Semiconductor Fuse, 3 required	CH103309
Aux Semiconductor Fuse, 3 required	CH103363
Aux Fuseholder, 3 required	CP103373
Pot kit inc. graduated dial and knob	POTKIT

TT2050

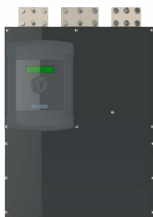


900KW 2050A THIS MODEL HAS REGENERATIVE STOPPING CAPABILITY AS STANDARD

Options
 TE - top entry (standard)
 BE - bottom entry (no cost option)
 MV - 600VAC (extra cost option)
 HV - 690VAC (extra cost option)
 Refer to supplier for information

Controller	PL900
Line Reactor	LR2050
Main Semiconductor Fuse, 3 required	CH103310
Aux Semiconductor Fuse, 3 required	CH103363
Aux Fuseholder, 3 required	CP103373
Pot kit inc. graduated dial and knob	POTKIT

TT2250



980KW 2250A THIS MODEL HAS REGENERATIVE STOPPING CAPABILITY AS STANDARD

Options
 TE - top entry (standard)
 BE - bottom entry (no cost option)
 MV - 600VAC (extra cost option)
 HV - 690VAC (extra cost option)
 Refer to supplier for information

Controller	PL980
Line Reactor	LR2250
Main Semiconductor Fuse, 3 required	CH103467
Aux Semiconductor Fuse, 3 required	CH103363
Aux Fuseholder, 3 required	CP103373
Pot kit inc. graduated dial and knob	POTKIT

TT/X RANGE, DIGITAL THREE PHASE 4Q FULLY REGENERATIVE CONTROLLER WITH INTEGRAL FIELD WEAKENER

TTX12



5KW 12A 4Q

Controller	TT/X12
Line reactor	LR48
Aux Semiconductor Fuse, 3 required 6 x 32	CH00620A
Aux Fuseholder, 3 required 6 x 32	CP102071
DIN Rail Clip for holder, 6 required	FE101969
Main Semiconductor Fuse, 3 required 6 x 32	CH00612A
Main Fuseholder, 3 required 6 x 32	CP102071
Armature fuse size 000	CH00816A
Armature fuseholder size 000	CP102054
Pot kit including graduated dial & knob	POTKIT

TTX24



10KW 24A 4Q

Controller	TT/X24
Line reactor	LR48
Aux Semiconductor Fuse, 3 required 6 x 32	CH00620A
Aux Fuseholder, 3 required 6 x 32	CP102071
DIN Rail Clip for Aux Fuseholder, 3 required	FE101969
Main Semiconductor Fuse, 3 required 14 x 51	CH00740A
Main Fuseholder, 3 required 14 x 51	CP102053
Armature fuse size 000	CH00832A
Armature fuseholder size 000	CP102054
Pot kit including graduated dial & knob	POTKIT

TTX36



15KW 36A 4Q

Controller	TT/X36
Line reactor	LR48
Aux Semiconductor Fuse, 3 required 6 x 32	CH00620A
Aux Fuseholder, 3 required 6 x 32	CP102071
DIN Rail Clip for Aux Fuseholder, 3 required	FE101969
Main Semiconductor Fuse, 3 required 14 x 51	CH00740A
Main Fuseholder, 3 required 14 x 51	CP102053
Armature fuse size 1	CH00940A
Armature fuseholder size 1	CP102906
Pot kit including graduated dial & knob	POTKIT

TTX51



20KW 51A 4Q

Controller	TT/X51
Line reactor	LR48
Aux Semiconductor Fuse, 3 required 6 x 32	CH00620A
Aux Fuseholder, 3 required 6 x 32	CP102071
DIN Rail Clip for Aux Fuseholder, 3 required	FE101969
Main Semiconductor Fuse, 3 required Size 000	CH00850A
Main Fuseholder, 3 required Size 000	CP102054
Armature fuse size 1	CH00963A
Armature fuseholder size 1	CP102906
Pot kit including graduated dial & knob	POTKIT

PRODUCT NAME

PART

PART NO.

TTX72



30KW 72A 4Q

Controller
 Line reactor
 Aux Semiconductor Fuse, 3 required 6 x 32
 Aux Fuseholder, 3 required 6 x 32
 DIN Rail Clip for Aux Fuseholder, 3 required
 Main Semiconductor Fuse, 3 required Size 000
 Main Fuseholder, 3 required Size 000
 Armature Fuse size 1
 Armature Fuseholder size 1
 Pot kit including graduated dial & knob

TT/X72
 LR120
 CH00620A
 CP102071
 FE101969
 CH00880A
 CP102054
 CH00980A
 CP102906
 POTKIT

TTX99



40KW 99A 4Q

Controller
 Line reactor
 Aux Semiconductor Fuse, 3 required 6 x 32
 Aux Fuseholder, 3 required 6 x 32
 DIN Rail Clip for Aux Fuseholder, 3 required
 Main Semiconductor Fuse, 3 required Size 000
 Main Fuseholder, 3 required Size 000
 Armature Fuse size 1
 Armature Fuseholder size 1
 Pot kit including graduated dial & knob

TT/X99
 LR120
 CH00620A
 CP102071
 FE101969
 CH008100
 CP102054
 CH009125
 CP102906
 POTKIT

TTX123



50KW 123A 4Q

Controller
 Line reactor
 Aux Semiconductor Fuse, 3 required 6 x 32
 Aux Fuseholder, 3 required 6 x 32
 DIN Rail Clip for Aux Fuseholder, 3 required
 Main Semiconductor Fuse, 3 required Size 000
 Main Fuseholder, 3 required Size 000
 Armature Fuse size 1
 Armature Fuseholder size 1
 Pot kit including graduated dial & knob

TT/X123
 LR120
 CH00620A
 CP102071
 FE101969
 CH008125
 CP102054
 CH009160
 CP102906
 POTKIT

TTX155



65KW 155A 4Q

Controller
 Line reactor
 Aux Semiconductor Fuse, 3 required 6 x 32
 Aux Fuseholder, 3 required 6 x 32
 DIN Rail Clip for Aux Fuseholder, 3 required
 Main Semiconductor Fuse, 3 required Size 000
 Main Fuseholder, 3 required Size 000
 Armature Fuse size 1
 Armature Fuseholder size 1
 Pot kit including graduated dial & knob

TT/X155
 LR330
 CH00620A
 CP102071
 FE101969
 CH008160
 CP102054
 CH009200
 CP102906
 POTKIT

TTX205



85KW 205A 4Q

Controller
 Line reactor
 Aux Semiconductor Fuse, 3 required 6 x 32
 Aux Fuseholder, 3 required 6 x 32
 DIN Rail Clip for Aux Fuseholder, 3 required
 Main Semiconductor Fuse, 3 required Size 1
 Main 3 pole Fuseholder Size 1
 Armature fuse size 1
 Armature fuseholder size 1
 Pot kit including graduated dial & knob

TT/X205
 LR330
 CH00620A
 CP102071
 FE101969
 CH009250
 CP102055
 CH009250
 CP102906
 POTKIT

PRODUCT NAME

PART

PART NO.

TTX270



115KW 270A 4Q

Controller
 Line reactor
 Aux Semiconductor Fuse, 3 required 6 x 32
 Aux Fuseholder, 3 required 6 x 32
 DIN Rail Clip for Aux Fuseholder, 3 required
 Main Semiconductor Fuse, 3 required Size 1
 Main 3 pole Fuseholder Size 1
 Armature fuse size 1
 Armature Fuseholder size 1
 Pot kit including graduated dial & knob

TT/X270
 LR330
 CH00620A
 CP102071
 FE101969
 CH009250
 CP102055
 CH009315
 CP102906
 POTKIT

TTX330



145KW 330A 4Q

Controller
 Line reactor
 Aux Semiconductor Fuse, 3 required 6 x 32
 Aux Fuseholder, 3 required 6 x 32
 DIN Rail Clip for Aux Fuseholder, 3 required
 Main Semiconductor Fuse, 3 required Size 3
 Main 3 pole Fuseholder Size 3
 Armature fuse size 1
 Armature Fuseholder size 1
 Pot kit including graduated dial & knob

TT/X330
 LR330
 CH00620A
 CP102071
 FE101969
 CH010550
 CP102233
 CH009400
 CP102906
 POTKIT

TTX430



185KW 430A 4Q

Controller
 50 Amp option on field output
 Line reactor
 Aux Semiconductor Fuse Size 000, 3 required
 Aux Fuseholder Size 000, 3 required
 Main Semiconductor Fuse, 3 required Size 3
 Main 3 pole Fuseholder Size 3
 Armature fuse size 2
 Armature Fuseholder size 2
 Pot kit including graduated dial & knob

TT/X430
 LR530
 CH00850A
 CP102054
 CH010550
 CP102233
 CH013500
 CP102949
 POTKIT

TTX530



225KW 530A 4Q

Controller
 50 Amp option on field output
 Line reactor
 Aux Semiconductor Fuse Size 000, 3 required
 Aux Fuseholder Size 000, 3 required
 Main Semiconductor Fuse, 3 required Size 3
 Main 3 pole Fuseholder Size 3
 Armature Fuse size 2
 Armature Fuseholder size 2
 Pot kit including graduated dial & knob

TT/X530
 LR530
 CH00850A
 CP102054
 CH010550
 CP102233
 CH013550
 CP102949
 POTKIT

TTX650



275KW 650A 4Q

Options
 TE - top entry (standard)
 BE - bottom entry (no cost option)
 50 Amp field (extra cost option)
 MV - 600VAC (extra cost option)
 HV - 690VAC (extra cost option)
 Refer to supplier for information

Controller
 Line Reactor
 Main Semiconductor Fuse, 3 required
 Aux Semiconductor Fuse, 3 required
 Aux Fuseholder, 3 required
 Armature Fuse, 2 required
 Pot kit inc. graduated dial and knob

TT/X650
 LR650
 CH103311
 CH103361
 CP103371
 CH103321
 POTKIT

TTX750



315KW 750A 4Q

Options
 TE - top entry (standard)
 BE - bottom entry (no cost option)
 50 Amp field (extra cost option)
 MV - 600VAC (extra cost option)
 HV - 690VAC (extra cost option)
 Refer to supplier for information

Controller
 Line Reactor
 Main Semiconductor Fuse, 3 required
 Aux Semiconductor Fuse, 3 required
 Aux Fuseholder, 3 required
 Armature Fuse, 2 required
 Pot kit inc. graduated dial and knob

TT/X750
 LR750
 CH103312
 CH103361
 CP103371
 CH103322
 POTKIT

TTX850



360KW 850A 4Q

Options
 TE - top entry (standard)
 BE - bottom entry (no cost option)
 50 Amp field (extra cost option)
 MV - 600VAC (extra cost option)
 HV - 690VAC (extra cost option)
 Refer to supplier for information

Controller
 Line Reactor
 Main Semiconductor Fuse, 3 required
 Aux Semiconductor Fuse, 3 required
 Aux Fuseholder, 3 required
 Armature Fuse, 2 required
 Pot kit inc. graduated dial and knob

TT/X850
 LR850
 CH103313
 CH103361
 CP103371
 CH103323
 POTKIT

TTX950



400KW 950A 4Q

Options
 TE - top entry (standard)
 BE - bottom entry (no cost option)
 50 Amp field (extra cost option)
 MV - 600VAC (extra cost option)
 HV - 690VAC (extra cost option)
 Refer to supplier for information

Controller
 Line Reactor
 Main Semiconductor Fuse, 3 required
 Aux Semiconductor Fuse, 3 required
 Aux Fuseholder, 3 required
 Armature Fuse, 2 required
 Pot kit inc. graduated dial and knob

TT/X950
 LR950
 CH103314
 CH103361
 CP103371
 CH103324
 POTKIT

TTX1050



440KW 1050A 4Q

Options
 TE - top entry (standard)
 BE - bottom entry (no cost option)
 50 Amp field (extra cost option)
 MV - 600VAC (extra cost option)
 HV - 690VAC (extra cost option)
 Refer to supplier for information

Controller
 Line Reactor
 Main Semiconductor Fuse, 3 required
 Aux Semiconductor Fuse, 3 required
 Aux Fuseholder, 3 required
 Armature Fuse, 2 required
 Pot kit inc. graduated dial and knob

TT/X1050
 LR1050
 CH103315
 CH103361
 CP103371
 CH103325
 POTKIT

TTX1250



520KW 1250A 4Q

Options
 TE - top entry (standard)
 BE - bottom entry (no cost option)
 MV - 600VAC (extra cost option)
 HV - 690VAC (extra cost option)
 Refer to supplier for information

Controller
 Line Reactor
 Main Semiconductor Fuse, 3 required
 Aux Semiconductor Fuse, 3 required
 Aux Fuseholder, 3 required
 Armature Fuse, 2 required
 Pot kit inc. graduated dial and knob

TT/X1250
 LR1250
 CH103316
 CH103363
 CP103373
 CH103326
 POTKIT

PRODUCT NAME

PART

PART NO.

TTX1450



600KW 1450A 4Q

Options
 TE - top entry (standard)
 BE - bottom entry (no cost option)
 MV - 600VAC (extra cost option)
 HV - 690VAC (extra cost option)
 Refer to supplier for information

Controller	TT/X1450
Line Reactor	LR1450
Main Semiconductor Fuse, 3 required	CH103317
Aux Semiconductor Fuse, 3 required	CH103363
Aux Fuseholder, 3 required	CP103373
Armature Fuse, 2 required	CH103327
Pot kit inc. graduated dial and knob	POTKIT

TTX1650



700KW 1650A 4Q

Options
 TE - top entry (standard)
 BE - bottom entry (no cost option)
 MV - 600VAC (extra cost option)
 HV - 690VAC (extra cost option)
 Refer to supplier for information

Controller	TT/X1650
Line Reactor	LR1650
Main Semiconductor Fuse, 3 required	CH103318
Aux Semiconductor Fuse, 3 required	CH103363
Aux Fuseholder, 3 required	CP103373
Armature Fuse, 2 required	CH103328
Pot kit inc. graduated dial and knob	POTKIT

TTX1850



800KW 1850A 4Q

Options
 TE - top entry (standard)
 BE - bottom entry (no cost option)
 MV - 600VAC (extra cost option)
 HV - 690VAC (extra cost option)
 Refer to supplier for information

Controller	TT/X1850
Line Reactor	LR1850
Main Semiconductor Fuse, 3 required	CH103319
Aux Semiconductor Fuse, 3 required	CH103363
Aux Fuseholder, 3 required	CP103373
Armature Fuse, 2 required	CH103329
Pot kit inc. graduated dial and knob	POTKIT

TTX2050



900KW 2050A 4Q

Options
 TE - top entry (standard)
 BE - bottom entry (no cost option)
 MV - 600VAC (extra cost option)
 HV - 690VAC (extra cost option)
 Refer to supplier for information

Controller	TT/X2050
Line Reactor	LR2050
Main Semiconductor Fuse, 3 required	CH103320
Aux Semiconductor Fuse, 3 required	CH103363
Aux Fuseholder, 3 required	CP103373
Armature Fuse, 2 required	CH103330
Pot kit inc. graduated dial and knob	POTKIT

TTX2250



980KW 2250A 4Q

Options
 TE - top entry (standard)
 BE - bottom entry (no cost option)
 MV - 600VAC (extra cost option)
 HV - 690VAC (extra cost option)
 Refer to supplier for information

Controller	TT/X2250
Line Reactor	LR2250
Main Semiconductor Fuse, 3 required	CH103468
Aux Semiconductor Fuse, 3 required	CH103363
Aux Fuseholder, 3 required	CP103373
Armature Fuse, 2 required	CH103469
Pot kit inc. graduated dial and knob	POTKIT

TT/TTX



OPTIONS & ACCESSORIES

Profibus card	Profibus card
Devicenet card	Devicenet card
Mounting board for fieldbus cards	LA103690
Daisy chain mtg board for Profibus/Devicenet	LA103001
Additional Drive to PC comms cable	LA102595
Drive to drive cable FCC68/FCC68	LA102596
Venting kit for TT/X 650 - 1050	LA103392
Venting kit for TT/X 1250 - 2250	LA103402



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