INSTALLATION INSTRUCTION

TLS-X-48

AC-DC Power Shelf



MODELS:	TLS-X-48
AC Input [1]:	~ 3-Phase 230 - 277 / 400 - 480 VAC 3W + PE
AC Input Current [2]:	18-14 A
Frequency:	50 /60 Hz
DC Output:	⎓ 39 – 57 VDC adjustable
DC Output Current [2]:	200 A
Safety Approvals:	UL/CSA 62368-1 4th edition IEC 62368-1 4th edition CE Mark for LVD

[1] Input selection is automatic, no manual change is required.
[2] The Input / Output currents and power will be halved when the TLS is assembled with only one TLP5000 power module. Install on empty slot front panel blind XEF.20027.0.

MODEL NAME NOMENCLATURE

Typical Model Designation:

TLS-X-48

Model series:
TLS

Nominal output voltage:
48 VDC

Number of rectifiers:
0 = Empty shelf
1 = One TLP5000 power module installed
2 = Two TLP5000 power modules installed

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS — This installation contains important instructions for our TLS-X-48 that should be followed during the maintenance of the unit.

DISCLAIMER

It is the customer's responsibility to check the suitability and qualify the product in their application, if any queries please contact Bel (at powersupport@belf.com or website belfuse.com) to ensure product remains within specification at all time.
Supplier shall in no way be liable for use or installation of the product outside of the parameters of the specification.

INSTALLATION REQUIREMENTS

TLS-X-48 contains two power modules TLP5000-1048. There are 3 input fuses with rating 20 A / 500 V inside each power module TLP5000-1048.
Recommended rating of upstream fuse or circuit breaker is 25 A per phase.
For further details, please see TLP5000-1048 datasheet (BCD.20322), TLS-2-48 communication manual (BCA.20099) and mechanical drawing (TLS-2-48.FD).

Note: Bel's power shelves are designed in accordance with EMC regulations. When they are integrated into a system, the EMC characteristics of the end system must be re-verified again. It is needed to use ferrite beads to meet EN 55011 Class A: WE 74272222 or equivalent: 2 turns at L1, L2, L3 (Input AC);
WE 74271251or equivalent: 1turn at Vout+ and Vout- (Output DC).

CAUTION / ATTENTION



CAUTION – This component level power shelf is intended exclusively for installation within other equipment by an industrial assembly operation or by professional installers. This is Class I * power shelf; the unit must be properly connected to earth ground in end use. A component power shelf should be installed in end-use equipment according to the requirements of the safety standard used for that equipment. This power shelf unit is not designed to be operated outside of an enclosure which provides a means of mechanical, electrical, and fire protection. To maintain ES1 requirements, the outputs should not be connected together in any manner which causes the total output voltage to exceed 60 VDC.

*According to IEC 62368-1: 3.3.15.1, class I equipment is one in which protection against electric shock does not rely on basic insulation only, but that includes a supplementary safeguard in such a way that means are provided for the connection of accessible conductive parts to the protective earthing conductor in the fixed wiring of the installation.

ATTENTION – Cette étagère d'alimentation au niveau composant est destinée exclusivement à être intégrée dans d'autres équipements dans le cadre d'une opération d'assemblage industriel ou par des installateurs professionnels. Cette étagère d'alimentation est un équipement de Classe I* ; l'unité doit être correctement raccordée à la terre de protection lors de l'utilisation finale. Une étagère d'alimentation de type composant doit être installée dans l'équipement final conformément aux exigences de la norme de sécurité applicable à cet équipement. Cette unité d'étagère d'alimentation n'est pas conçue pour fonctionner en dehors d'une enceinte assurant une protection mécanique, électrique et contre l'incendie. Afin de maintenir les exigences ES1, les sorties ne doivent en aucun cas être connectées ensemble d'une manière susceptible de porter la tension totale de sortie au-delà de 60 VCC.

*Selon la norme IEC 62368-1 : 3.3.15.1, un équipement de classe I est un équipement dans lequel la protection contre les chocs électriques ne repose pas uniquement sur une isolation de base, mais qui inclut une protection supplémentaire de telle sorte que des moyens soient prévus pour le raccordement des équipements accessibles, parties conductrices au conducteur de protection dans le câblage fixe de l'installation.

CAUTION - Do not use this product if there is any damage to the unit.
ATTENTION – Ne pas utiliser le produit si celui-ci est endommagé.



CAUTION – Risk of electric shock. Do not remove the top cover or attempt to open the enclosure.
No user serviceable parts are inside. Please refer servicing to qualified service personnel.
ATTENTION – Risque d'électrocution. Ne pas retirer le couvercle ni tenter d'ouvrir le boîtier. Cet appareil ne contient aucun composant susceptible d'être réparé par l'utilisateur. Pour toute réparation, s'adresser à des spécialistes qualifiés.
CAUTION – Do not remove the top cover or attempt to open the enclosure as you will void the warranty.
ATTENTION – Ne pas retirer le couvercle supérieur ni tenter d'ouvrir le boîtier au risque d'annuler la garantie.
CAUTION – High voltage: Turn off the AC input before disconnecting any terminal. Discharge the power terminals before servicing.
ATTENTION – Haute tension : coupez l'alimentation secteur avant de débrancher une borne. Déchargez les bornes d'alimentation avant de procéder à l'entretien.



CAUTION – Heavy object: Can cause muscle strain or back injury. Use lifting aids and proper lifting techniques when removing or replacing.
ATTENTION – Peut provoquer des tensions musculaires ou des blessures au dos. Utilisez des aides au levage et des techniques de levage appropriées lors du retrait ou du remplacement.



CAUTION – READ THIS CAREFULLY BEFORE INSTALLATION! Before operating, read this document thoroughly and keep it for future reference. Not respecting these instructions may reduce the performance and safety of the converter and could cause danger for people.
ATTENTION – À LIRE ATTENTIVEMENT AVANT TOUTE INSTALLATION! Avant toute utilisation, lire ce document attentivement et le conserver à des fins de consultation ultérieure. Le non-respect de ces instructions peut altérer les performances et la sécurité des dispositifs et impliquer des dangers pour les personnes et l'appareil.

WARNING / AVERTISSEMENT

WARNING – The equipment is for industrial or business use (Class A, EN 61000-6-4). This product may cause interference if used in residential areas. Such use must be avoided unless the user takes special measures to reduce electromagnetic emissions to prevent interference to the reception of radio and television broadcasts.

AVERTISSEMENT – L'équipement est destiné à un usage industriel ou professionnel (Classe A, EN 61000-6-4). Ce produit peut provoquer des interférences s'il est utilisé dans des zones résidentielles. Une telle utilisation doit être évitée à moins que l'utilisateur ne prenne des mesures spéciales pour réduire les émissions électromagnétiques afin d'éviter toute interférence avec la réception des émissions de radio et de télévision.

WARNING – Maximal Touch current measured according to IEC 62368-1 is 9.6 mA.

Besides of connector ground wire it must be used also an additional grounding wire (6 mm^2) connected on the grounding screw (M6) on the chassis.

AVERTISSEMENT – Le courant de contact maximal mesuré selon la norme IEC 62368-1 est de 9.6 mA.

À l'exception du fil de terre du connecteur, il faut également utiliser un fil de terre supplémentaire connecté à la vis de terre du châssis.

WARNING – Maximal value of the Protective conductor current (leakage current) is 17 mA. It is recommended using a 30 mA residual current device.

AVERTISSEMENT – La valeur maximale du courant du conducteur de protection (courant de fuite) est de 17 mA. Il est recommandé d'utiliser un protecteur de courant de 30 mA.

WARNING – Caution, this is a heavy equipment, weight 16 kg.

AVERTISSEMENT – Attention, il s'agit d'un matériel lourd, pesant 16 kg.

PROTECTIVE EARTHING

The Power Shelf must be properly grounded to mains protective earth termination at end use.

SERVICING

In case of failure, the power shelf must be returned to a Bel Power Solutions Authorized Service Center. There are no user serviceable parts in this power shelf.

LIMITED WARRANTY

Bel Power Solutions warrants each power supply of its manufacture for a period of two years from the date of original shipment. This warranty applies to defects in materials and workmanship that result in non-performance to published specifications. The product(s) must be returned to a Bel Power Solutions Authorized Service Center for repair with a Bel Power Solutions preassigned RMA number.
Bel Power Solutions assumes no liabilities for consequential damages of any kind through the use or misuse of its products by any user. No other obligations are expressed or implied. Please note that the specifications, terms, and conditions stated are subject to change without notice.

NUCLEAR AND MEDICAL APPLICATIONS

Bel Power Solutions products are not designed, intended for use in, or authorized for use as critical components in life support systems, equipment used in hazardous environments, or nuclear control systems without the express written consent of the respective divisional president of Bel Power Solutions.

TECHNICAL REVISIONS

The appearance of product, including safety agency certifications pictured on labels, may change depending on the date manufactured.
Specifications are subject to change without notice.

CONNECTORS AND PINOUTS DESCRIPTION

For exact positions of connectors, see Figure 2. Rear View - Connectors.

INPUT POWER CONNECTOR – PINOUT

SIGNAL NAME	PIN #	TYPE	RECOMMENDED WIRES	V MAX I MAX
Earth	⏚	Protective Earth	Min. 2.5 mm^2	528 Vrms (line to line) 18 Arms (per line)
AC Line 3	L3	Input Power AC Fused	Min. 2.5 mm^2	
AC Line 2	L2	Input Power AC Fused	Min. 2.5 mm^2	
AC Line 1	L1	Input Power AC Fused	Min. 2.5 mm^2	

Connector type: *WAGO 2624-1504*
Mating part: *Strip length between 10 and 12 mm. Use fine-stranded conductors with ferrule.*

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OUTPUT POWER CONNECTOR - PINOUT

SIGNAL NAME	PIN #	TYPE	RECOMMENDED WIRES	V MAX I MAX
VOUT+	+	Output Power DC	Min. 70 mm²	60 VDC 210 ADC
VOUT-	-	Output Power DC	Min. 70 mm²	

Connector type: *Busbars M8 screw*
Mating part: *Ring terminal for M8 screw*

ACTIVE CURRENT SHARE / SENSE CONNECTOR – PINOUT

SIGNAL NAME	PIN #	TYPE	SIGNAL REFERENCE	LOW LEVEL HIGH LEVEL	V MAX I MAX
ACSH	1	Active Current Share	ACSH_RTN	0.2 VDC to 5.0 VDC	7 VDC 0.7 mA
ACSH_RTN	2	Active Current Share Return	-	-	-
SENSE-	3	Sense line for VOUT- Voltage drop compensation for negative pole	VOUT+	-	-
SENSE+	4	Sense line for VOUT+ Voltage drop compensation for positive pole	VOUT-	-	-

Connector type: *PHOENIX CONTACT 1803293*
Mating part: *PHOENIX CONTACT 1803594*

SIGNAL CONNECTOR – PINOUT

SIGNAL NAME	PIN #	TYPE	SIGNAL REFERENCE	LOW LEVEL HIGH LEVEL	V MAX I MAX
CAN_H [2]	1	Communication Data	CAN_L	-	-2 to 7 VDC 15 mA
Not Connected	2	-	-	-	-
+5V_AUX_RTN	3	Auxiliary Output Ground (Return)	-	-	-
INPUT_OK	4	AC Power Fault or Warning - open collector, external pull-up needed to max. 7 V	SRTN	<0.4 VDC Pull up	7 VDC 20 mA
OUTPUT_OK	5	Output Voltage Fault - open collector, external pull-up needed to max. 7 V	SRTN	<0.4 VDC Pull up	7 VDC 20 mA
INHIBIT	6	Output Inhibit - Open circuit or “High” to SRTN shuts OFF Vout	SRTN	<0.4 VDC >2.5 VDC	3.6 VDC 0.2 mA
STANDBY	7	Power Supply Standby Pin – Open circuit or “High” to SRTN means Standby mode – Vout is disabled with low power consumption	SRTN	<0.4 VDC >2.5 VDC	3.6 VDC 0.2 mA
SRTN [1]	8	Signal Ground (Return)		-	-
CAN_L [2]	9	Communication Data	CAN_H	-	-2 to 7 VDC 15 mA
PS_PRESENT_CHAIN_TLP [1]	10	Power Supply Seated module TLP1 – Input Signal	SRTN	-	1 VDC 100 mA
+5V_AUX	11	Auxiliary Output +5 VDC, max. 0.5 A	AUX_RTN	4.8 VDC to 5.2 VDC	5 VDC 0.5 A
OTP/FAILURE	12	Over Temperature / Over Load Fault - open collector, external pull-up needed to max. 7 VDC	SRTN	<0.4 VDC Pull up	7 VDC 20 mA
PS_PRESENT_CHAIN_TLP [2]	13	Power Supply Seated module TLP2 – Input Signal	SRTN	-	1 VDC 100 mA
I_MARGIN	14	Analog Signal for Output Current Adjustment	SRTN	-	5.5 VDC 0.2 mA
V_MARGIN	15	Analog Signal for Output Voltage Adjustment	SRTN	-	5.5 VDC 0.2 mA

[1] *SRTN and Vout- are connected together inside the power supply*
[2] *120 Ω resistors connection required between CAN_L and CAN_H on both sides externally*

Connector type: *AMPHENOL L17H2430131SD/SD*
Mating part: *Würth Elektronik 61801529321*
Würth Elektronik 61801529221

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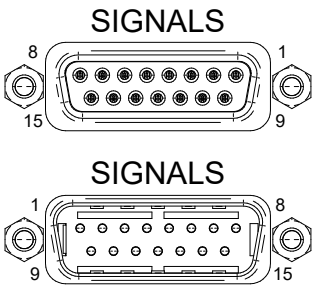


Figure 1. Detail of Signal Connector

ADDRESS – DIP SWITCH FUNCTION

SWITCH 1 ADDR_0_TLP2	SWITCH 2 ADDR_1_TLP2	SWITCH 3 ADDR_2_TLP2	UNIT ADDRESS TLP2	
			HEX	DEC
OFF	OFF	OFF	0xC1	193
ON	OFF	OFF	0xC2	194
OFF	ON	OFF	0xC3	195
ON	ON	OFF	0xC4	196
OFF	OFF	ON	0xC5	197
ON	OFF	ON	0xC6	198
OFF	ON	ON	0xC7	199
ON	ON	ON	0xC8	200

SWITCH 4 ADDR_0_TLP1	SWITCH 5 ADDR_1_TLP1	SWITCH 6 ADDR_2_TLP1	UNIT ADDRESS TLP1	
			HEX	DEC
OFF	OFF	OFF	0xC1	193
ON	OFF	OFF	0xC2	194
OFF	ON	OFF	0xC3	195
ON	ON	OFF	0xC4	196
OFF	OFF	ON	0xC5	197
ON	OFF	ON	0xC6	198
OFF	ON	ON	0xC7	199
ON	ON	ON	0xC8	200

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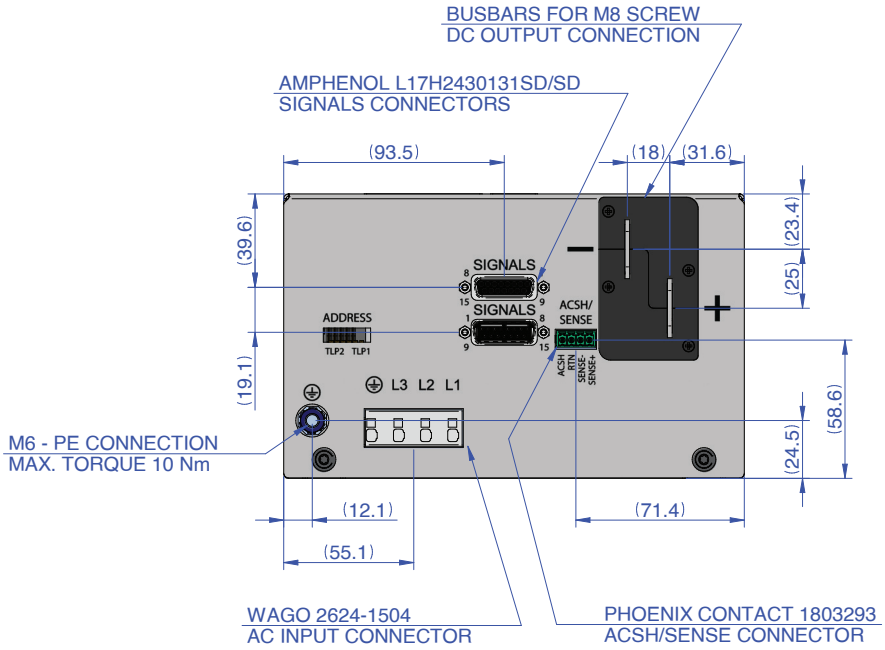


Figure 2. Rear View - Connectors

LED SIGNALING

LED NAME	COLOR	STATUS	OPERATING CONDITIONS
AC-OK	Green	ON Blinking	AC Input Voltage is within operation range FW upgrade via CAN
DC-OK	Green	ON	Output is Enabled and Operational
OT/FAIL	Orange	ON Blinking	Over Temperature conditions inside the unit or FAIL appeared (e.g. Overload) Over Temperature warning

COOLING

Liquid cooled:
Inlet Coolant Temp.: 0°C to 40°C
Coolant Flow: 5 l/min ± 2 l/min
Max. Coolant Pressure: 6 bar

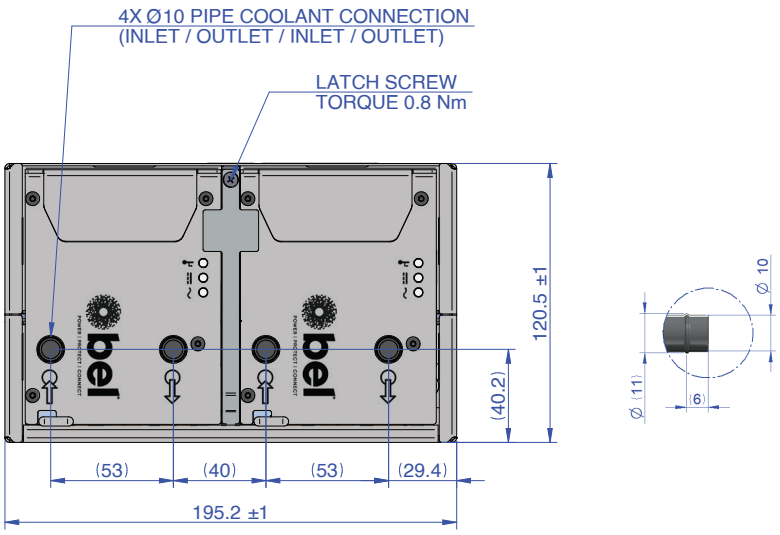


Figure 4. Front View – LEDs and Coolant Connection

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MECHANICAL DIMENSIONS

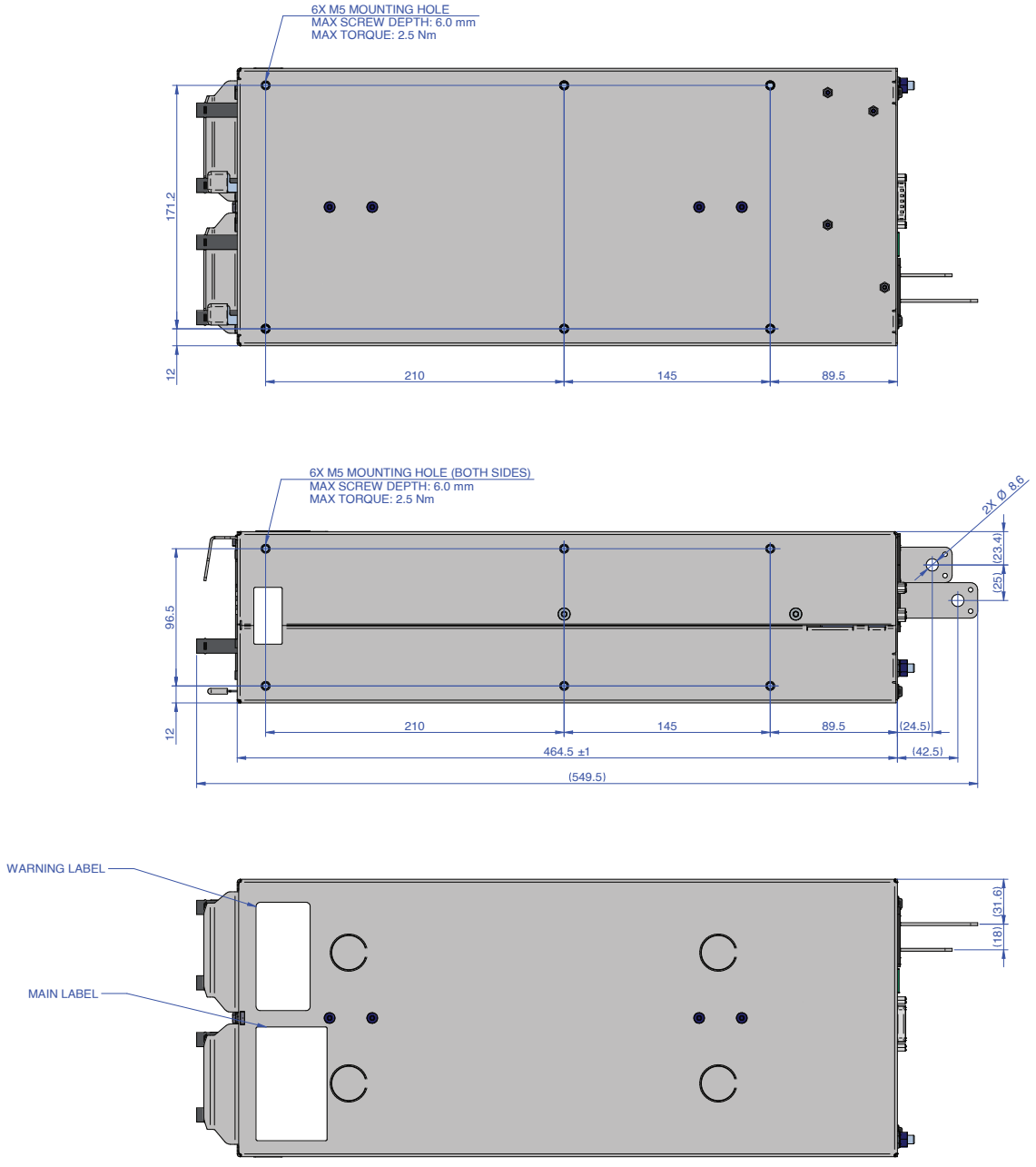


Figure 3. Mechanical Drawing (bottom, side and top view)

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