

TMdrive-DCe2

Product Application Guide

WWW.TMEIC.COM

JAPAN | NORTH AMERICA | SOUTH AMERICA | EUROPE | SOUTHEAST ASIA | INDIA | CHINA | MIDDLE EAST | AUSTRALIA

A Wide Variety of Frames and Form Factors

Voltage	Гиото	Output	Ra	ting Cu	rent (Ol	-5)	Heat Loss	Weight	Fig	
Class	Frame Size	KW	OL%	10s	30s	60s	kW	Kg	#	· Circuit Diagram
		32	150	80	80	80				
		29	200	73	73	73				
	TML-A10	26	250	66	66	66	0.95	350	1	
		23	300	58	58	58				
		96	150	240	240	240				
	TN41 420	80	200	225	205	165		250		THY-STACK
	TML-A20	66	250	190	170	165	2.4	350	1	440Vac (515Vac mac)
		56	300	160	145	140				
		240	150	600	600	600				200-220/vac 50-60/tz MCCB
	TML-A30	184	200	550	490	460	5.75	450	2	
		148	250	460	410	370	./.5	450		
		128	300	320	320	320				
		288	150	720	720	720				
	TML-A40	264	200	660	660	660	7.6	650	3	
410Vdc (515Vdc		240	250	600	600	600	7.0	050		PIIO CARD CARD
max)		208	300	520	520	520				
		480	150	1200	1200	1200				
	TML-A50	420	200	1100	1100	1050	11.2	650	3	
		344	250	1000	950	860				
		292	300	870	800	730				
		576	150	1440	1440	1440				
		528	200	1320	1320	1320				
	TML-A60	480	250	1200	1200	1200	14.4	1200	4	
		420	300	1050	1050	1050				
		960	150	2400	2400	2400				
		776	200	2300	2220	1940				
	TML-A70	648	250	2020	1770	1620	24	1200	4A	
		552	300	1790	1530	1380				
		900	150	1200		1200				
		698	200	1105		930				THY-STACK
	TML-B10	570	250	940		760	9	750	5	750Vac 50-80Hz MCCB CT BUS ARMATURE 750Vac
		488	300	820		650				SU-GUHZ MCCB CT 50Vdc DCM
		1080	150	1440		1440				200-220Vac MCCB
750//	TN41 D20	990	200	1320		1320	1 44 7	1200		CONTROL POWER
750Vdc	TML-B20	900	250	1200		1200	11.7	1200	6	
		795	300	1060		1060				
		1800	150	2400		2400				GATE SIGNALS
	TML-B30	1530	200	2400		2040	16.3	1200	6	CONTROL CARD
		1275	250	2300		1700	10.5	1200	0	<xio> COMMUNICATION PIO CARD CARD</xio>
		1087	300	2060		1450				

Notes TML-Ax0:

3. Frames TML-A60 and A70 do not have a Circuit Breaker in the panel. They also require an external line reactor.

4. Panels require front access only

Notes TML-Bx0:

- 1. MCCB and AC Line Reactor are provided as an option.
- 2. DC contactor closes the main circuit when UV signal is on.
- 3. Armature disconnect switch is offered as an option.
- 4. Panels require front access only.

^{1.} An incoming panel is required to a line-up with multiple drives.

^{2.} Armature disconnect switch is offered as option

TMdrive-DCe2

Voltage	Frame	Output	Ra	iting Cu	rent (OL	-s)	Heat Loss	Weight	Fig	
Class	Size	КW	OL%	10s	60s	120s	kW	Kg	#	Circuit Diagram
	TML-B110	1853	175		2470		12	1360	7	
		1481	225		1975		12	1500	Ĺ	
	TML-B120	3533	175		4710		27	2200	8	<thy-fanel> THY-STACK REACTOR HISCB</thy-fanel>
750Vdc		2828	225		3770			2200	Ľ	
/ soruc	TML-B130	5062	175		6750		34	2960	9	750/06c CT 1<
		4050	225		5400			2500		
	TML-B140	6750	175		6750		41	3800	10	-AUTO & FIELD PANEL- GATE SIGNLS
		5400	225		5400					POWER (OPTION)
	TML-C110	2346	175		1955		10	1360	7	
		1872	225		1560				Ĺ	
	TML-C120	4470	175		3725		21	2200	8	CONTROL POWER CTRD- CONTROL CARD , CDISP> DISPLAY UNIT
1200Vdc		3564	225		2970				Ľ	
1200100	TML-C130	3696	175		5330		28	2960	9	VIC> PIJO CARD CARD
		5112	225		4260					
	TML-C140	8532	175		7110		38	3800	10	
		6816	225		5680					
	TML-B210	3705	175		4940		23	2720	9	
		2963	225		3950					<thy-panela> THY-STACK HSCB</thy-panela>
	TML-B220	7065	175		9420		54	3800	10	CT CT CT CT
750Vdc		5655	225		7540					
	TML-B230	10125	175		13500		67	5920	11	
		8100	225		10800					0······
	TML-B240	13500	175		18000		81	7000	12	750/de 50-404/2: 0-### CT \$3.3 0-### CT \$1.3 0-### CT \$1.3 0-##
		10800	225		14400					
	TML-C210	4692	175		3910		20	2720	9	<auto &="" field="" panel=""> GATE SIGNALS</auto>
		3744	225		3120					200-220Vac MCCB (OPTION)
	TML-C220	8940	175		7450		43	3800	10	
1200Vdc		7128	225		5940					
	TML-C230	12792	175		10660		60	5920	11	
		10224	4 225 85	8520					PID CARD CARD	
	TML-C240	17064	175		14220		76	7000	12	
		13632	225		11360		/0	/000		

Notes TML-Bxx0 and Cxx0:

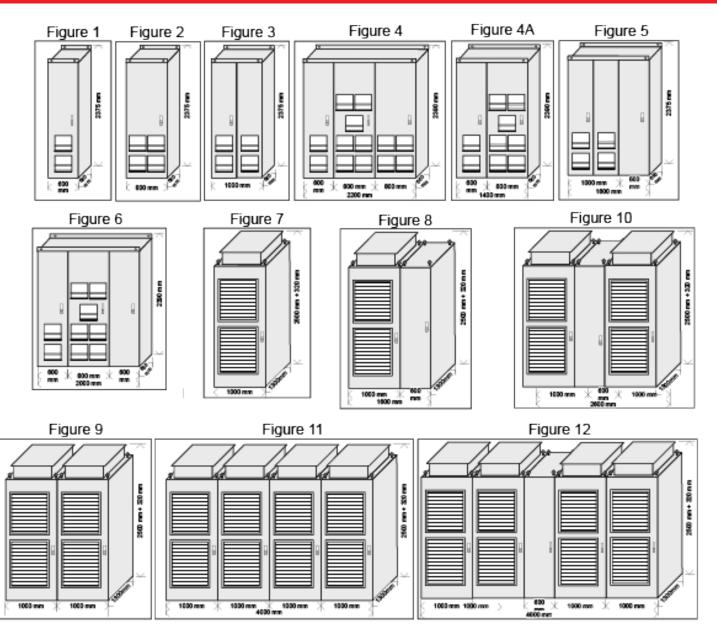
1. Panels require front and rear access.

Dimensions shown in referenced figures do not include the Automation and Field Exciter panels: 2000 mm W x 650 mm D x 2300 mm H.

Bridges are equipped with Heat Pipe cooling system.
 TML-B2x0 and C2x0 are 12-pulse converters.
 Field exciter can be provided with line reactor as option.

	Mechanical Characteristics								
	Standard design	Option							
Standards	JIS, JEC, JEM	IEC, CE Mark							
Altitude	Less than 1000 m	Above 1000 m current derate: -1%/200 m up to 5000 m Above 4000 m voltage derate -2.5%/200 m up to 5000 m							
Ambient Temperature	0° to 40° C	Above 40° C, derate -2.5%/°C up to 50°C							
Humidity	5% to 85% non-condensing								
Paint color	5Y7/1								
Enclosure	IP20	IP21							
Handle	Key and padlock								

Specifications



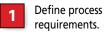
	Electrical Characteris	tics
	Standard design	Option
Frequency	50 / 60 Hz ±2Hz	
Main circuit	Copper (no plating)	Copper tin plated
Control power	3 Ph 200 V 50 Hz, 220/230 V 60 Hz ±10%	
Speed reg. accuracy	±0.01% with sensor	$\pm 0.1\%$ with analog input, $\pm 1\%$ with Voltage control
Field weakening range	1.5 with sensor only	
Speed control range	0.5% to 100% with sensor	5% to 100% Voltage control
Speed reg. response	30 rad/s max.	
Current reg. response	500 rad/s max.	
Current control accuracy	±0.5%	
PLG input max. freq.	100 kHz	
Field exciter	Single phase 40 Adc. 160 Vdc	Single phase 220 Vdc. Three phase also available, see page 8.

Applications

TMdrive-DCe2

Application Example

When specifying a DC drive, start from the process requirements and work through the motor to the converter. The following example illustrates this process.

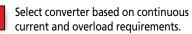


- 2 Select motor based on
 - process requirements and compute required power.
 - 150 kW
 - 900 rpm, 440 V
 - Efficiency = 0.93
 - Service factor = 1.25

The motor delivers constant torque from zero to base speed of 900 rpm and 150 kW.

Duty cycle requires 150% for 10 sec, but has an rms duty cycle of 150 kW . $I_{crv} = \frac{kW_{s_{hat}} \bullet 1000 \bullet SF_{hatr}}{Eff_{Mir} \bullet V_{Mir}}$ $I_{crv} = \frac{150kW \bullet 1000 \bullet}{0.93 \bullet 440V} 1.25 = 458A$

3 Compute continuous current requirements for the converter based on the selected motor.



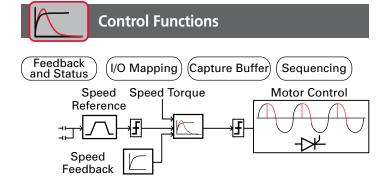
4

Scan the 150% entries in the 440V converter tables for a frame where the continuous current rating exceeds 458 A. The **TML-A30** frame meets this criterion (600 A) and is appropriate for this application.

		Output	Rating Current (OL - s)				
Voltage Class	Frame Size	kW	OL %	10s	30s	60s	
		240	150	600	600	600	
440 Vdc	TML-A30	184	200	550	490	460	
(515Vdc max.)	TML-A30	148	250	460	410	370	
		128	300	320	320	320	

		Typical Confi	guration	
Converter configuration	# of motors	Sample applications Main circuit diagram		Remarks
Six pulses - anti-parallel	1, 2 to 4	Cranes, Paper Machines, Metal Processing Lines		_
12 pulses - anti-parallel	1, 2 to 4	Rolling mill main drives		_
12 pulses - anti-parallel	1	Rolling mill main drives, mining hoists		12 pulses and sequential asymmetrical gate control
Motor & generator set 1 to 2 gens. Motor & generator set 1 to 2 motors		Rolling mill drives, metal processing lines, cranes		_
Field circuit changeover	1	Metal processing lines, paper machines		_

Specifications



LAN Interface Options

- TC-net I/O
- Ethernet GlobalData (EGD)
- Profibus-DP
- ModbusRTU
- Modbus-TCP
- CC-Link
- DeviceNet
- ControlNet
- MELPLAC
- Profinet
- Ethernet/IP

TOSLINE-S20 and ISBus legacy LANs can also be supported on request.

	Instrum	entation Interface
Standard Display		 The digital display alternates between speed, current, and fault code in the event of an error RJ-45 Ethernet port for local/remote toolbox connection Ready, Run, and Alarm/Fault LEDs Interlock button disables drive
Optional Graphic Keypad		 Four configurable variable bar graphs with descriptive legends Status icons reflecting health of drive at a glance Dedicated drive control keys for manual operation of the drive Full access to all parameters and variables
Config- uration		 RJ-45 Ethernet interface 10 Mbps maximum TMdrive-Navigator
Motor		 Motor current A and B, ±10 V Quantity 5 configurable, ±10 V, 8-bit resolution

Diagnostic and Protective Functions

Simulation mode for testing and training:

Motor simulator
 Load Simulator

 High-speed data captu Configurable trigger (8 channels) Fault data capture (9 history, total 1MB of 	data capture 10 channels, 7-fault
Protection: • Over speed • Cooling fan failure • Stall	Speed errorTimed overcurrentMotor overheat
Configurable sequentia • Start • Stop	al functions: • Alarm • Trip, etc.



I/O Interface

Digital Inputs	 UVS (dedicated): 1 channel Additional 10 configurable channels 24 Vdc ±10%, Input current about 10mA at 24Vdc Either internal or external power supply selectable with a switch on the I/O board
Digital Outputs	 10 configurable channels 5-24 Vdc 110% +20% external power supply 24Vdc Internal power supply Up to 50 mA
Analog Inputs	 3 channels ±10 V or 4-20 mA 8 kOhm 3 bits (real 12 bits) Differential type only No external isolator required
Analog Outputs	 3 channels ±10 V up to 1mA 10 bits differential type No external isolator required
(Optional) Speed Feedback Resolver Input	 Excitation frequency 1 kHz or 4 kHz Type 1X, 4X 4X up to 300 rpm
Speed Feedback Encoder Input	 Max. frequency 100kHz, different type Max. frequency 10kHz, single-end type 5 Vdc/15Vdc power supply Differential or single-end inputs: 5-15Vdc
Speed Tach Follower Output	 A, B, Z Max. freq. 100 kHz (totem-pole output) 12-24 Vdc (-10%, +20%) Up to 25 mA

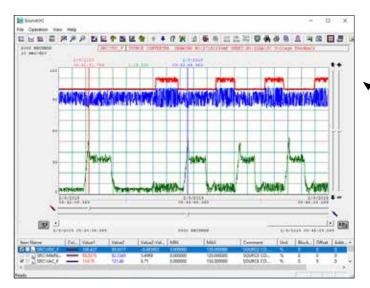
TMdrive-Navigator

TMdrive-DCe2

								- 🗆 X
e Edit View	Drive Management Diagno	astics Trending Tool	a Reports Windows	Help				Welcome Admi
·	TOP/Bottom Made []+] 😥	📶 🛛 🛦 🖬 🔄 🚊	******				UVS	(t)
es.	GNTRI	SRC	SRC		LECTI	Test	×	
upo 7-17-2019 🗙	COO F Test					Alter Antoin		
1_1.4 🗙								
'alzone 🗙	Drive Details			12				
sat 🗙	Drive Name :	Test	EEPROM Bank :	A ~		Drive Type :	TM-P10e2	
ts23-20190724 🗙	Panel Name :	Test				Firmware Version :	A44A17A	
Ingrouped Drives		100			_	Drive File Name :	Test	
Test	Order Number :	1	Item Number :	È.		Tag :	â	21
Home Page			item Humper :	-		1421		
Block Diag	Connection Details							
Browse Sig	Connection Type :	1:1 ~	Drive IP Address :	192 168	87 . 13			
CRM_TR1	2010/00/00/2010							
Test10	Equipment Rating				Summary	Block Diagram		
A_onty	Drive : 426 V - 91	9 A - 651.2 kVA 0 poles - 380 V - 656 A - 50	the Areta I		1			1
F2_Abank	Motor: 500 km - 0	pores - 360 Y - 636 A - 30	H2 - 0 mm-1				and an other	
Test2						a. z	A 19	
						100 Mar 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	151	
						- W -		

						1.12.22.22.	a. 5. 5. 4. 5.	
						And in case of the local division of the loc	and the second second	
					_	1		
	101	-			_	1 procession	****2	
	01	1					ww.22 .	
		Date And Time				1 2000 Co. 1000000	ww.gz ,	
		Date And Time					nndz ,	Į
	Event Counter Connection failed for Dr]
3 O Speed R	Event Counter Connection failed for Dr					A Bank A	Full	

Desktop-like search technology links topical signal lists, block diagrams, help files, product documentation, change history, and user notes. Windows techniques facilitate navigation within a drive and across the system. The status of all drives is always in view.



Live block diagrams provide a real-time graphical view of drive functions. Functions can be configured directly from the graphical view.

Product documentation is integrated right into the tool. Users can even capture their own notes to benefit future troubleshooting.

Compatible with:

- Windows 7 (32-bit, 64-bit)
- Windows 10 (64-bit)
- Windows Server 2012
- Windows Sever 2016

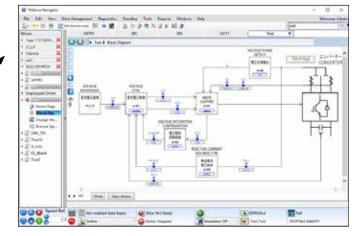
The TMdrive-Navigator tool helps you maintain TMEIC drives yourself. - Engineers and technicians are empowered to understand how the drive works and what the drive is doing. Any user can easily access current drive expertise and know-how.

	Browse p	Browse product help documents						×			
	Dou	ible click to a	pen select	ed docur	nent						
	Docu	ment info	Descrip	tion-				-			
	Com	ton .	Drive D	rvice Cor	werte	ors and Reserves	Storage A				
	Come	ion :	Drive Equipment Drive Equipment]							144.1	
	Come	ion			Test	Search Results				×	
	Come	ian	Drive Ed	poipment		meters and Vari	ables	_			
	Comit	Comison		(ulpmen)		Neme	Welue	Unit	Gringe		
	Come	Ion	Instruc	tion Man	P	AR.A	10923	T	AR.	10	
	Comm	ton	Instruct	tion Man	P	ARAZ	10923		AR		
	Comm	ion .	Instruct	tion Man	P	AVR. A.Z. CHG	10923	T	AR	v	
	Come	ion	Instruction Man Instruction Man Speed Sensor In		Write Change History a 4/7/2020 8:55:22 PM Test Admin						
	Come	ion									
	Come	ion									
	Come	Common		Speed Sensor Ir		Changed St., AVK_J (St. AvK Integral Gain) from 1 (F) to 0 (4/7/2020 8:54:59 PM Test Admin					
	Come	ton	TMdrive Series / Tostine-S20 Acti- Tostine-S20 Vine Upgrading TMdP CGD Application		Changed A/R_AL_2 (A/R Kate Kesp 2) from 25 (rad/s) to : 4/7/2020 8:54:49 PM Test Admin						
	Com	ion									
	Come	ton			User Notes Block Diagram					>	
	Come	ton								- (8)	
-	Com									- 8	
	225	History				(SLAVR) : SL_AVR (SLAVR) : SL_AVR					
Drive	Sank: @	Bank A	Bank B			(Cm/CRef) : AVR.					
Over	uged fly	Time		Chang		(CrivCRef) : AVR					
4deni	n.	4/7/2020 8	55-22 PM	Owne	1.1	(Cm/CRef) : AVR					
Admi	n	4/7/2020 8	54:59 PM	Chang	491 (CrivCRef) : AVR_AT						
Admin 4/7/200		4/7/2020 8	54:49 PM	Chang	Fault and Parameter Help						
Adein 4/		4/7/2020 8	54-44 PM	Chang	P R BITCHT LINE					-	
And Color				Chang	AVM A 2						
		4/7/2020 8:54:31 PM		CONTRACTOR OF	AVE A LINE						
Admi	n.	4/7/2020 8	03:00 FM	Chang	ANK	AL					
_						AL 2					

High speed data is automatically captured and saved in the event of a drive fault. Users can also capture high speed data based on their own trigger conditions or perform high resolution real-time trending.

Fault data can be automatically "pushed" to key users. The client-server architecture allows access to high performance data from remote locations – with the same resolution as if you were in the plant.

Wizards support tuning of drive functions.

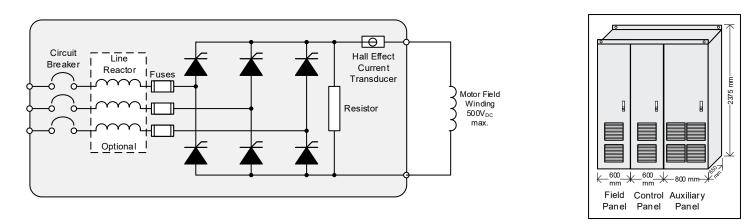


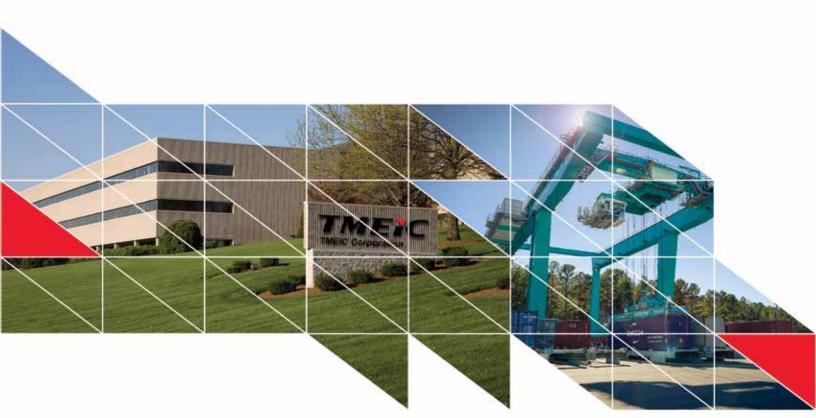
Main Motor Class Converters Automatic Panel and Field Panel

A Main Motor Class Converter, such as the TML-B1x0, TML-B2x0 and TML-C2x0, includes separated Control and Field Exciter Circuits. The Field Exciter is a three phase, 6-pulse thyristor rectifier. The Field Panel can also be combined with TML-Bx0 converters.

_	DC Voltage	DC Current
Frame	V _{DC}	A _{DC}
200	440	240
400	440	480

The width of the Auxiliary panel varies depending on the application.







TMEIC Corporation Americas | Roanoke, Virginia | Houston, Texas | WWW.TMEIC.COM

All specifications in this document are subject to change without notice. This brochure is provided free of charge and without obligation to the reader or to TMEIC. TMEIC does not accept, nor imply, the acceptance of any liability with regard to the use of the information provided. TMEIC provides the information included herein as is and without warranty of any kind, express or implied, including, but not limited to, any implied statutory warranty of merchantability or fitness for particular purposes. The information is provided to be acleved a general reference to the potential benefits that may be attributable to the technology discussed. Individual results may vary. Independent analysis and testing of each application is required to determine the results and benefits to be achieved from the technology discussed.

TMdrive is a trademark of TMEIC Corporation Americas. © 2023 TMEIC Corporation Americas. All Rights Reserved.