



LEGEND-MC Installation Guide

Upon receipt of the product and prior to initial operation, read these instructions thoroughly and retain for future reference.



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WARNING

YASKAWA manufactures component parts that can be used in a wide variety of industrial applications. The selection and application of YASKAWA products remain the responsibility of the equipment designer or end user. YASKAWA accepts no responsibility for the way its products may be incorporated into the final system design.

Under no circumstances should any YASKAWA product be incorporated into any product or design as the exclusive or sole safety control. Without exception, all controls should be designed to detect faults dynamically under all circumstances. All products designed to incorporate a component part manufactured by YASKAWA must be supplied to the end user with appropriate warnings and instructions as to that part's safe use and operation. Any warnings provided by Yaskawa must be promptly provided to the end user.

YASKAWA offers an express warranty only as to the quality of its products in conforming to standards and specifications published in YASKAWA'S manual. **NO OTHER WARRANTY, EXPRESS OR IMPLIED, IS OFFERED.** YASKAWA assumes no liability for any personal injury, property damage, losses or claims arising from misapplication of its products.

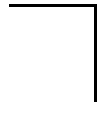
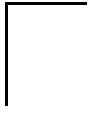


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NOTES:

Introduction

The LEGEND-MC is a single axis Ethernet motion controller designed for use exclusively with Yaskawa's LEGEND Digital Torque Amplifier.

It provides a structured text programming environment and the ability to perform many modes of motion including camming, gearing, and contouring. High speed product registration is also available as a standard feature.

Additionally, point-to-point control and communications over the Ethernet connections are standard features. The Ethernet function allows multiple handles or devices to communicate with the controller.

Part Numbers

		Description	Part Number
SMC3010	a)	Motion Controller with Ethernet Interface	SMC3010
	I/O	b)	1.0m 50 Pin I/O Cable
2.0m 50 Pin I/O Cable			JZSP-CKI01-2 (A)
3.0m 50 Pin I/O Cable			JZSP-CKI01-3 (A)
1.0m 50 Pin I/O Cable (with terminal block)			JUSP-TA50P
Serial	c)	3.0m Port #1 Cable	SMCCBL7
Software	d)	YTermProgrammingSoftware	SMCGUI1

Startup

Mounting the LEGEND-MC to the LEGEND Amplifier

1. Insert the lower two mounting notches of the LEGEND-MC into the mounting holes at the bottom of the right side of the LEGEND.
2. Push the LEGEND-MC in the direction indicated by the arrow in the figure below, and insert the upper mounting notches of the LEGEND-MC into the upper mounting holes on the right side of the LEGEND.

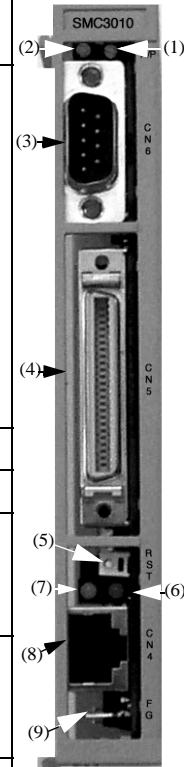
Mounting Orientation

Mount the LEGEND-MC and LEGEND vertically for proper cooling, as shown below. Allow a minimum spacing of 10mm around the left and right sides and 30mm around the top and bottom of the LEGEND-MC/LEGEND unit.

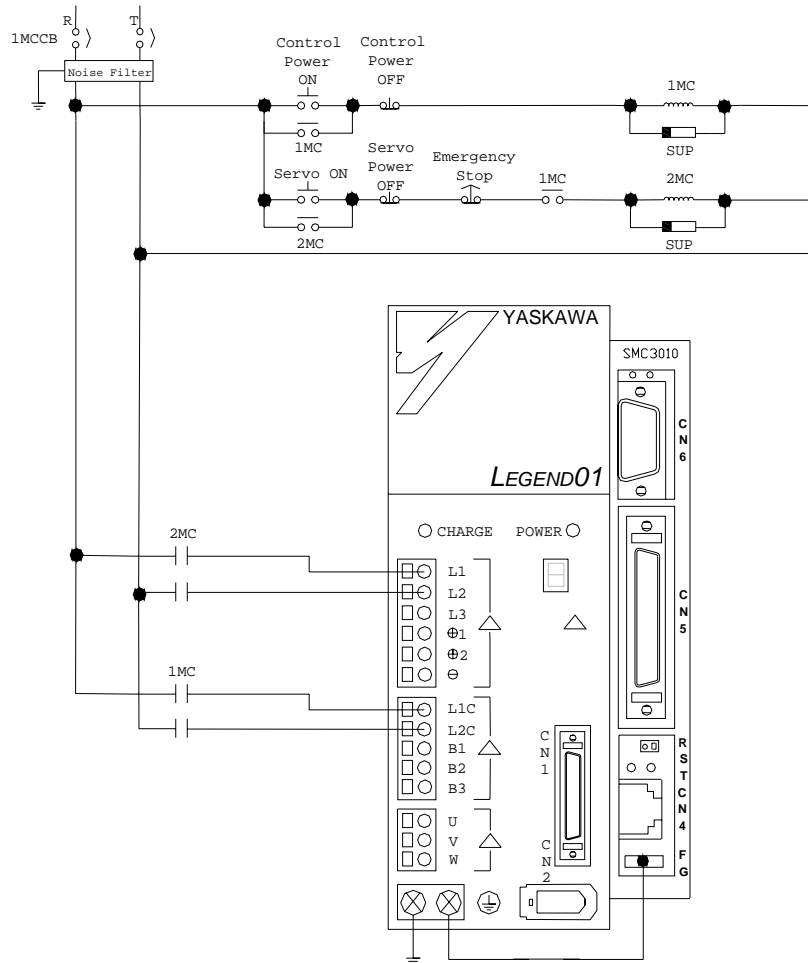


Front Panel Description

No.	Name	Description
(1)	Power ON	A green LED that indicates +5 VDC power is applied properly from the LEGEND-MC amplifier to the controller.
(2)	Alarm/ Error	A red LED that will flash on initially at power up and stay lit for approximately 1-8 seconds. After power up, the LED will illuminate for the following reasons: <ul style="list-style-type: none"> •The axis has a position error greater than the error limit. The error limit is set by using the command ER. •The reset line on the controller is held low or is being affected by noise. •There is a failure in the controller and the processor is resetting itself. •There is a failure in the output IC which drives the error signal.
(3)	CN6	9 pin male D-Sub serial port connector
(4)	CN5	3M 50 pin high density I/O connector
(5)	RST	Reset switch. Causes the controller to reboot, and load the application program and parameters from flash. If the program contains an #AUTO label, it will automatically execute.
(6)	Ethernet status	A green LED that is lit when there is an Ethernet connection to the controller. This LED tests only for the physical connection, not for an active or enabled link.
(7)	Ethernet status	The yellow LED indicates traffic across the Ethernet connection. This LED will show both transmit and receive activity across the connection. If there is no Ethernet connection or IP address assigned, the LED will flash at regular intervals to show that the BOOTP packets are being broadcast.
(8)	CN4	10 BaseT Ethernet RJ485 Connector
(9)	FG	Frame ground spade terminal. Connect to ground terminal on LEGEND Amplifier



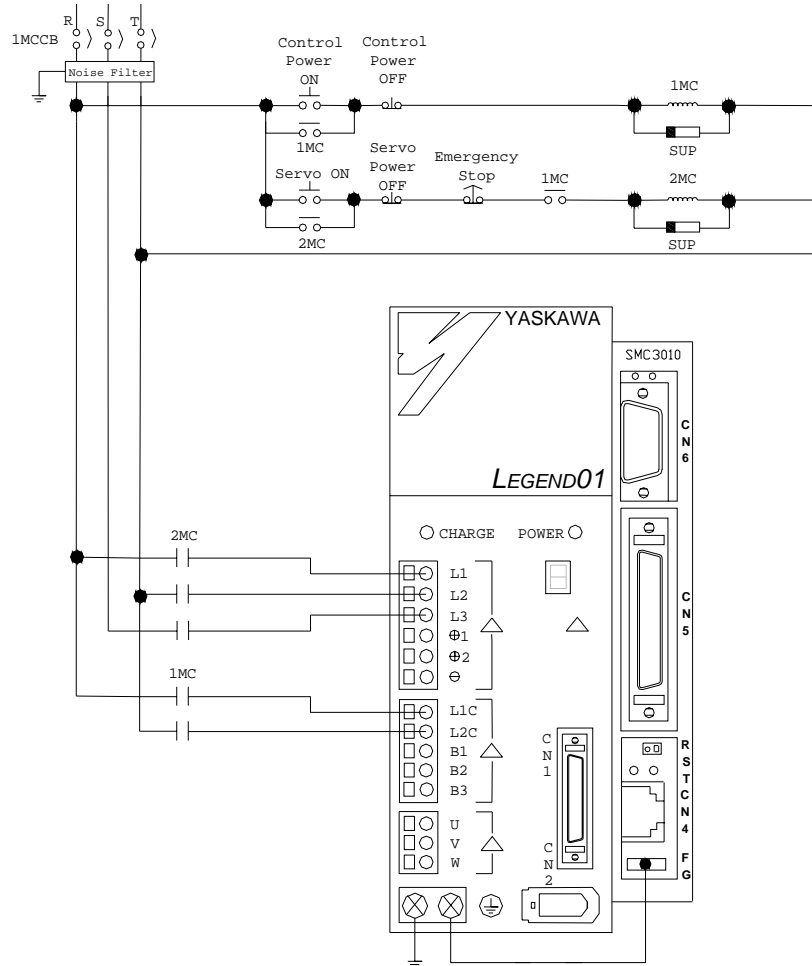
Power/Connections Wiring - Single Phase



Notes: The LEGEND-MC receives its power from the LEGEND amplifier through the side interface connector, however, the digital I/O receives its power from pins 46, 47, 48, and 49 on the I/O connector.

For maximum noise immunity, connect the FG to a ground terminal on the sub panel or to the ground terminal on the LEGEND.

Power/Connections Wiring - Three Phase

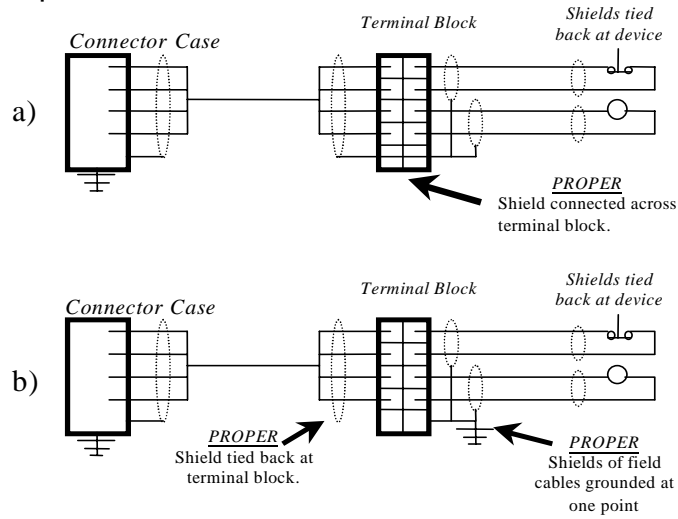


Notes: The LEGEND-MC receives its power from the LEGEND amplifier through the side interface connector, however, the digital I/O receives its power from pins 46, 47, 48, and 49 on the I/O connector.

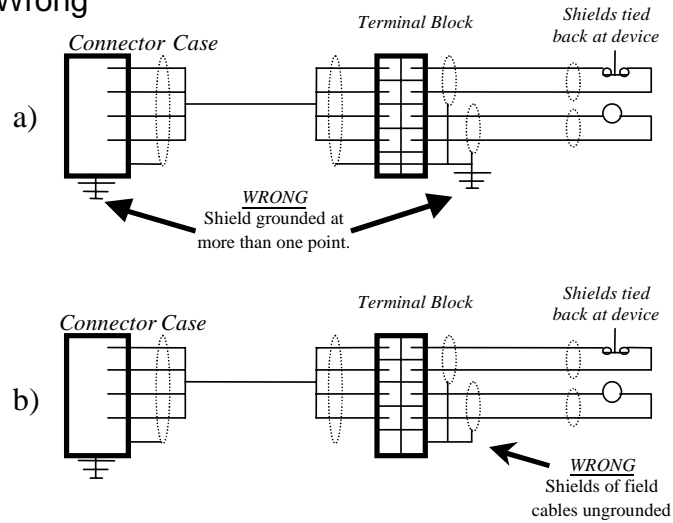
For maximum noise immunity, connect the FG to a ground terminal on the sub panel or to the ground terminal on the LEGEND.

Cable Shielding, Segregation and Noise Immunity

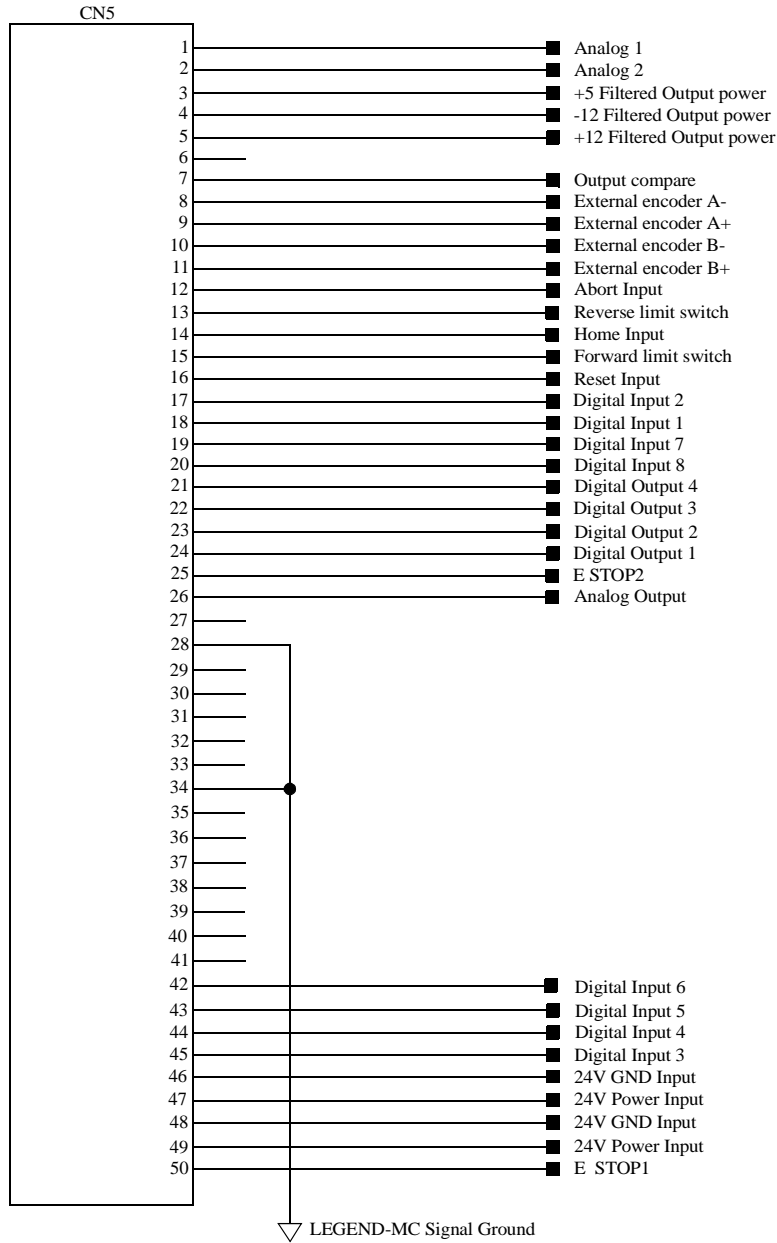
Proper



Wrong



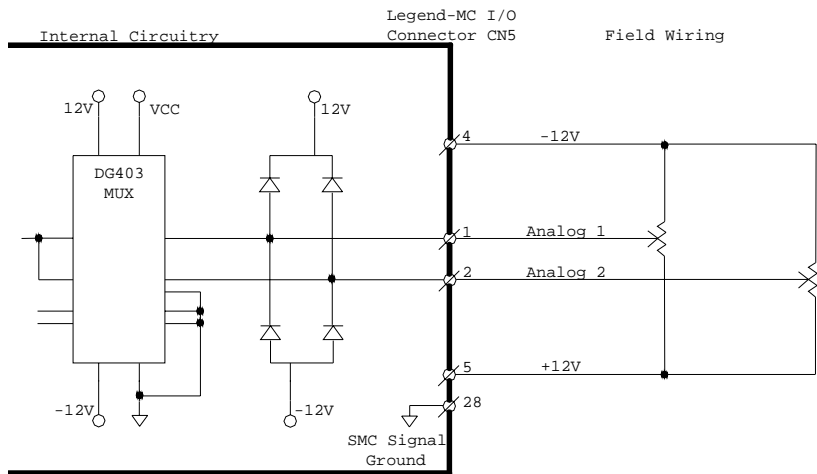
I/O Connections (50-pin CN5)



Analog I/O

Analog Input

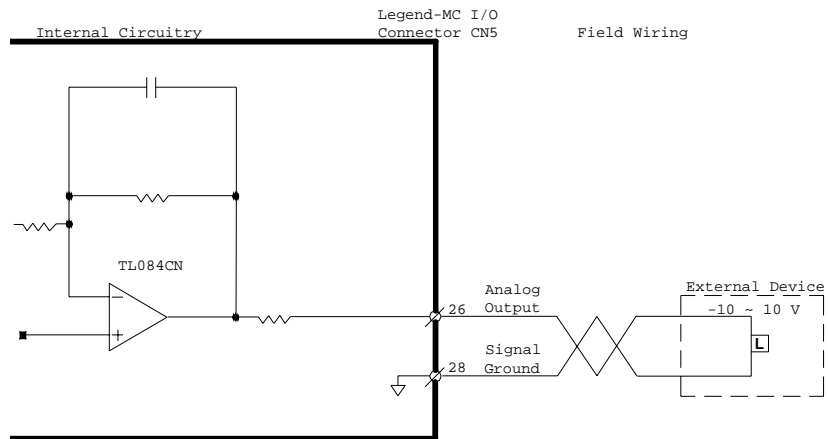
Item	Specifications
Input Voltage	± 10 V
Input Impedance	Approximately 10k Ω
Resolution	12 bits over a ± 10 V range or 4.88 mV per bit



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Analog Output

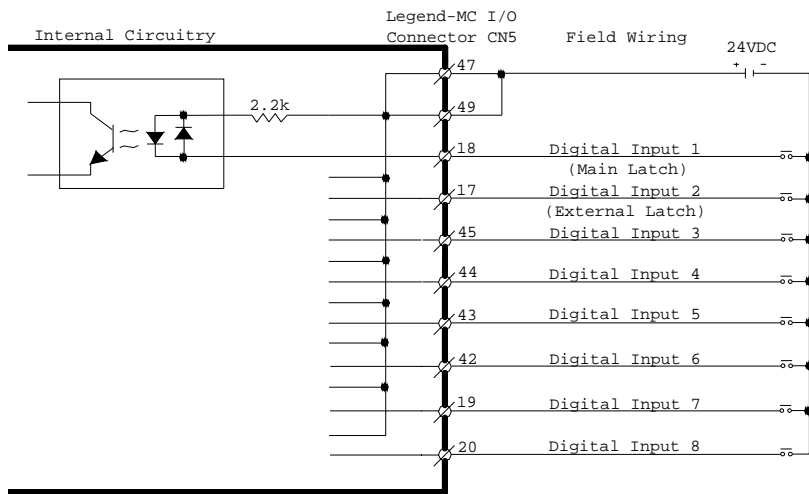
Item	Specifications
D/A Output Resolution	16 bit over a ± 10 V range or 328 $\mu\text{V/bit}$
Output short circuit duration	Infinite
Maximum output current	60 mA



Digital I/O

Digital Input

Item	Specifications
Number of Input Points	8
Input Format	Sinking
Isolation	Optical
Voltage	24 VDC \pm 20%
Current Rating (ON)	5.3 mA to activate
Input Impedance	2.2k Ω
Operation Voltage	Logic 0 <5V Logic 1 >15V
OFF Current	0.9 mA or less
Response Time	OFF to ON: <0.5 ms ON to OFF: <1.5 ms
Latch response time	Less than 25 μ sec
Minimum latch width	9 μ sec

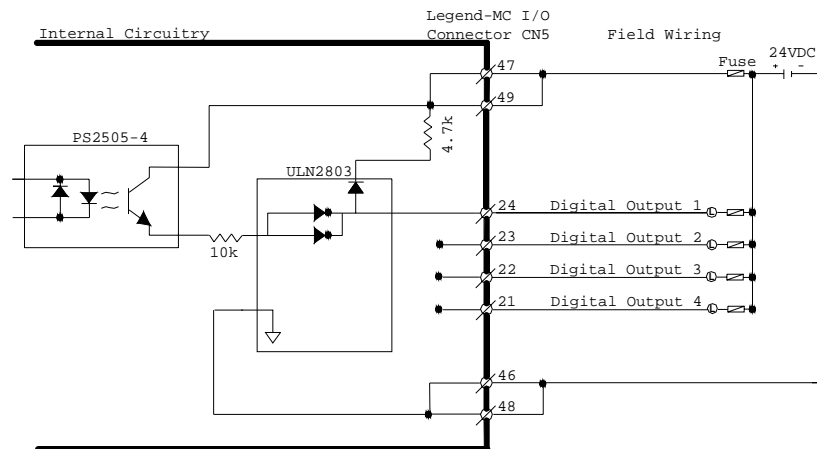


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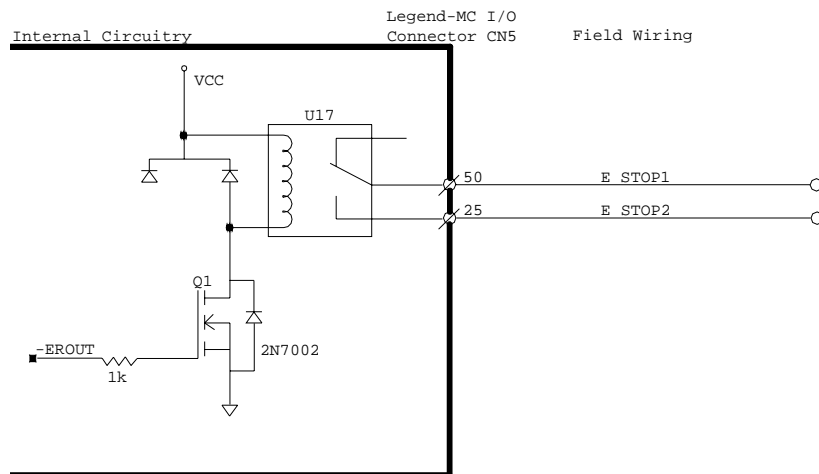
Digital Output

Item	Specifications
Number of Output Points	4
Output Format	Sinking
Output Classification	Transistor Output
Isolation	Optical
Load Voltage	24 VDC \pm 20%
Load Current	200 mA/Output (600 mA if activated individually)
Response Time	OFF to ON <0.25 ms ON to OFF <0.5 ms
External Common Power	24 VDC \pm 20% 15 mA
Common User Fuse Rating	1A
Individual User Fuse Rating	200 mA recommended

Note: The ULN 2803 output chip is capable of 600 mA at a single output, or 800mA for the four outputs simultaneously.



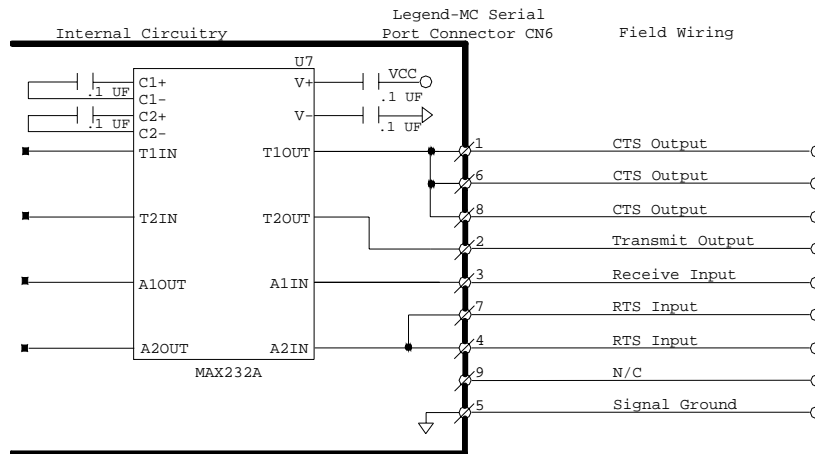
Emergency Stop Chain



The LEGEND-MC closes the relay contact under normal operating conditions.

Serial Communication

Item	Specifications
Baud Rate	9600 or 19200 settable by jumper JP1, default is 19200
Data Bits	8
Parity	None
Stop Bits	1

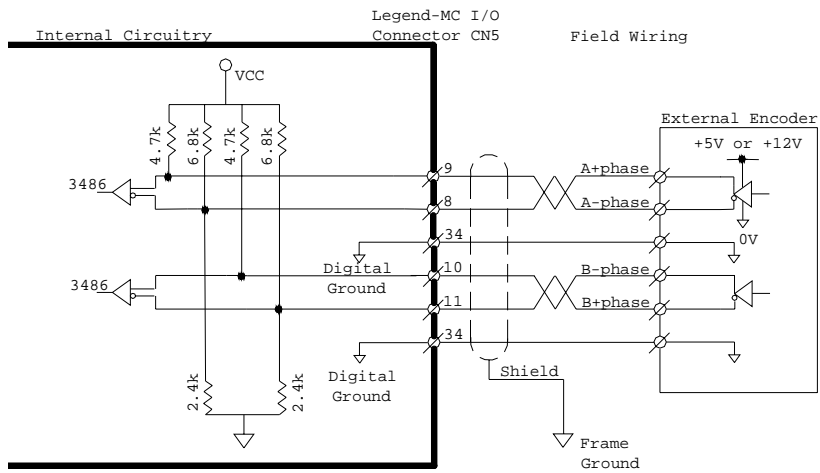


Note: Hardware handshaking must be used with the LEGEND-MC. If it is impossible to implement hardware handshaking, use a jumper between pins 1 and 4 in the connector.

Note: Do not connect pin 5 to a 24V ground.

External Encoder Specifications

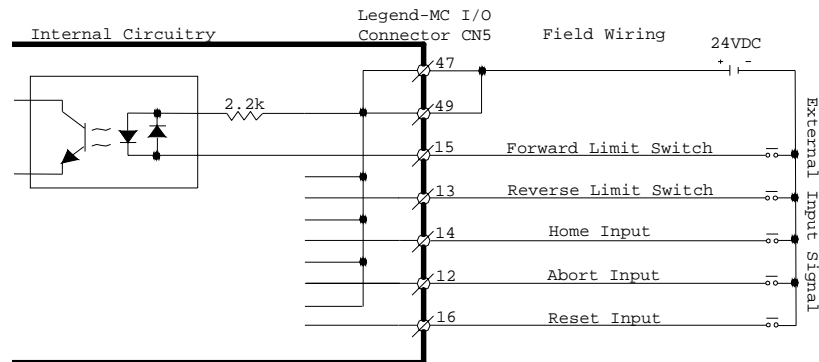
Item	Specifications
Input Format	Quadrature Pulse and Direction
Maximum Frequency	12 MHz



Standard voltage levels are TTL (0V to 5V), however, voltage levels up to 12V are acceptable. If using differential 12V signals, no modification is required. Single ended 12V signals require a bias voltage applied to the complimentary input, i.e.; use two 10k resistors, one connected to +12V and the other connected to the LEGEND signal ground to hold the /A phase and /B phase at 6VDC. Do not use a 24VDC encoder.

Dedicated Inputs

Item	Specifications
Number of Input Points	Forward limit, Reverse limit, Home, Abort, Reset
Input Format	Sinking
Isolation	Optical
Voltage	24 VDC \pm 20%
Current Rating (ON)	5.3 mA to activate
Input Impedance	2.2k Ω
Operation Voltage	Logic 0 <5V Logic 1 >15V
OFF Current	0.9 mA or less
Limit Switch Response Time	OFF to ON: <0.5 ms ON to OFF: <1.5 ms



Physical Specifications

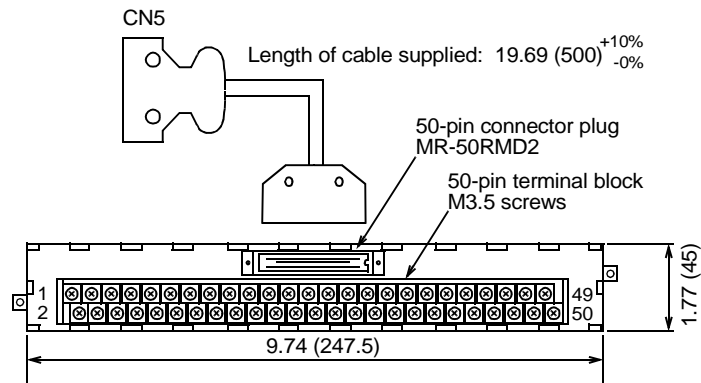
Description	Specifications
Depth:	130mm (5.12 in)
Width:	20 mm (.79 in)
Height:	142 mm (5.6 in)
Weight:	.18 kg (.4 lb.)
Vibration:	9.8 msec ² (1.0g)
Ambient temperature:	0 ~ 70° C (32 ~ 158° F)
Humidity:	Less than 95%
Noise:	IEC Level 3

Hardware Specifications

Description	Specifications
CPU:	25 mHz Motorola
Servo update:	1000 μs default, 250 μs minimum
Digital inputs:	(8), +24VDC
Dedicated inputs:	(5), +24VDC
Digital Outputs:	(4), +24VDC
Analog inputs:	(2) +/- 10 V 12 bit resolution
Analog outputs:	(1) +/- 10 V 16 bit resolution
Serial port:	(1) 9600 or 19200 baud
Ethernet:	(1) 10-base-T

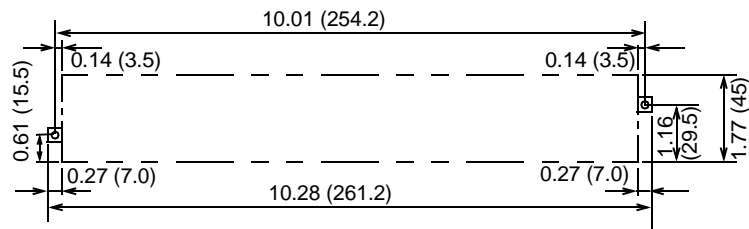
Cable Diagram and Dimensional Drawings

I/O Cable with Terminal Block JUSP-TA50P

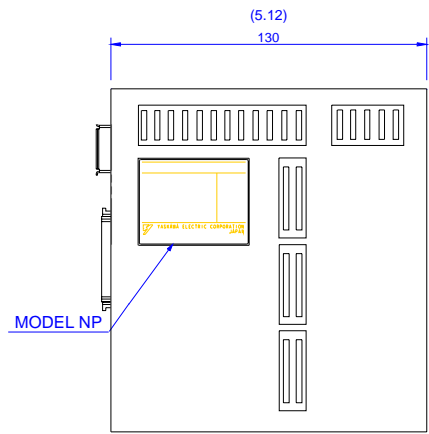
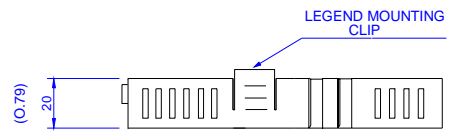
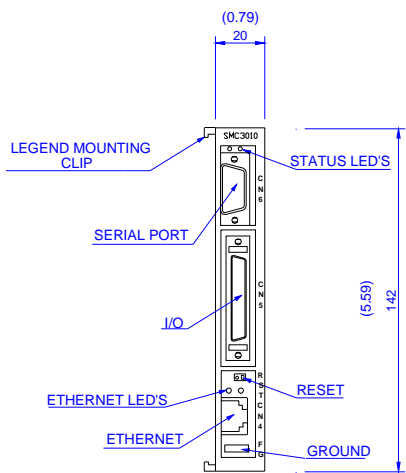


Connector Terminal Block Converter Unit
JUSP-TA50P* (cable included)

Mounting Hole Diagram

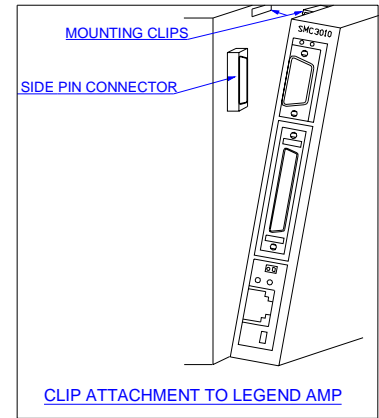


Terminal specifications : see I/O connections, page 8



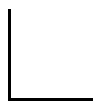
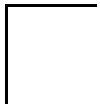
APPROX. MASS: 0.18kg

DIMENSIONS: MM (IN)



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NOTES:





YASKAWA ELECTRIC AMERICA, INC.

Chicago-Corporate Headquarters 2121 Norman Drive South, Waukegan, IL 60085, U.S.A.
Phone: (847) 887-7000 Fax: (847) 887-7310 Internet: <http://www.yaskawa.com>

MOTOMAN INC.

805 Liberty Lane, West Carrollton, OH 45449, U.S.A.
Phone: (937) 847-6200 Fax: (937) 847-6277 Internet: <http://www.motoman.com>

YASKAWA ELECTRIC CORPORATION

New Pier Takeshiba South Tower, 1-16-1, Kaigan, Minatoku, Tokyo, 105-0022, Japan
Phone: 81-3-5402-4511 Fax: 81-3-5402-4580 Internet: <http://www.yaskawa.co.jp>

YASKAWA ELETRICO DO BRASIL COMERCIO LTDA.

Avenida Fagundes Filho, 620 Bairro Saude Sao Paolo-SP, Brasil CEP: 04304-000
Phone: 55-11-5071-2552 Fax: 55-11-5581-8795 Internet: <http://www.yaskawa.com.br>

YASKAWA ELECTRIC EUROPE GmbH

Am Kronberger Hang 2, 65824 Schwalbach, Germany
Phone: 49-6196-569-300 Fax: 49-6196-888-301 Internet: <http://www.yaskawa.de>

MOTOMAN ROBOTICS AB

Box 504 S38525, Torsas, Sweden
Phone: 46-486-48800 Fax: 46-486-41410

MOTOMAN ROBOTEC GmbH

Kammerfeldstrabe 1, 85391 Allershausen, Germany
Phone: 49-8166-900 Fax: 49-8166-9039

YASKAWA ELECTRIC UK LTD.

1 Hunt Hill Orchardton Woods Cumbernauld, G68 9LF, Scotland, United Kingdom
Phone: 44-12-3673-5000 Fax: 44-12-3645-8182

YASKAWA ELECTRIC KOREA CORPORATION

Paik Nam Bldg. 901 188-3, 1-Ga Euljiro, Joong-Gu, Seoul, Korea
Phone: 82-2-776-7844 Fax: 82-2-753-2639

YASKAWA ELECTRIC (SINGAPORE) PTE. LTD.

Head Office: 151 Lorong Chuan, #04-01, New Tech Park Singapore 556741, SINGAPORE
Phone: 65-282-3003 Fax: 65-289-3003

TAIPEI OFFICE (AND YATEC ENGINEERING CORPORATION)

10F 146 Sung Chiang Road, Taipei, Taiwan
Phone: 886-2-2563-0010 Fax: 886-2-2567-4677

YASKAWA JASON (HK) COMPANY LIMITED

Rm. 2909-10, Hong Kong Plaza, 186-191 Connaught Road West, Hong Kong
Phone: 852-2803-2385 Fax: 852-2547-5773

BEIJING OFFICE

Room No. 301 Office Building of Beijing International Club,
21 Jianguomanwai Avenue, Beijing 100020, China
Phone: 86-10-6532-1850 Fax: 86-10-6532-1851

SHANGHAI OFFICE

27 Hui He Road Shanghai 200437 China
Phone: 86-21-6553-6600 Fax: 86-21-6531-4242

SHANGHAI YASKAWA-TONJI M & E CO., LTD.

27 Hui He Road Shanghai 200437 China
Phone: 86-21-6533-2828 Fax: 86-21-6553-6677

BEIJING YASKAWA BEIKE AUTOMATION ENGINEERING CO., LTD.

30 Xue Yuan Road, Haidian, Beijing 100083 China
Phone: 86-10-6232-9943 Fax: 86-10-6234-5002

SHOUGANG MOTOMAN ROBOT CO., LTD.

7, Yongchang-North Street, Beijing Economic & Technological Development Area,
Beijing 100076 China

Phone: 86-10-6788-0551 Fax: 86-10-6788-2878

YEA, TAICHUNG OFFICE IN TAIWAN

B1, 6F, No. 51, Section 2, Kung-Yi Road, Taichung City, Taiwan, R.O.C. Phone: 886-4-2320-2227 Fax: 886-4-2320-2239
Phone: 55-11-5071-2552 Fax: 55-11-5581-8795 Internet: <http://www.yaskawa.com.br>