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Laser Solutions for Advanced Manufacturing
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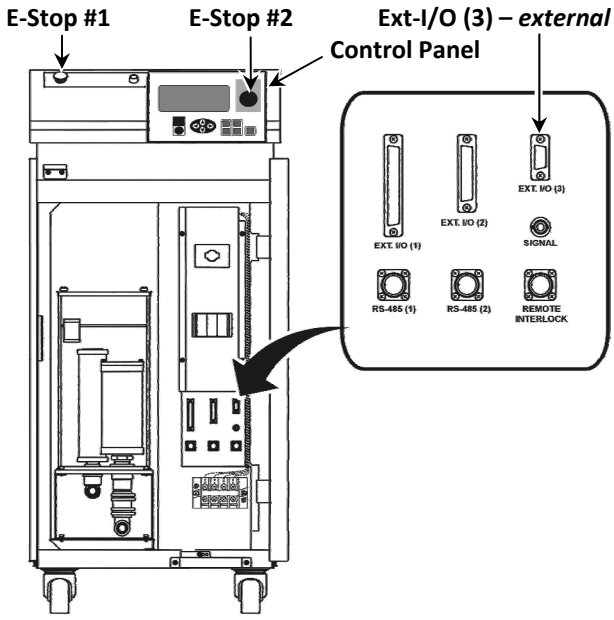
E03: Emergency Stop

Troubleshooting an *Emergency Stop* Error

An "**E03 – Emergency Stop**" error indicates that the (non-CE) Laser is in an Emergency Stop mode. When the Laser is in Emergency Stop mode, Laser operation is not possible.

The function of Emergency Stop (or E-stop) is to immediately cease all Laser functions in the event of an emergency. When the Laser is put in an E-Stop mode all optical shutters close and the High-Voltage and Cooling Systems shut down. In CE models, the Laser turns off (with the exception of the E-Stop Power Supply). The smaller LW5A(M)/15A/25A and LW2AG/5AG Lasers are CE compatible and do not display the E03 error.

All Laser models have two primary Emergency Stop inputs; (1) an E-Stop panel switch (**E-Stop #1**) on the front panel and (2) an E-Stop input on the DB9 External I/O connector, which allows for external E-Stop functionality. On Laser models where the Program Box (Control Panel) can be removed, there is an additional E-Stop panel switch (**E-Stop #2**) on the Program Box (Control Panel). This allows the Laser operator to activate the E-Stop function if remotely controlling the Laser Welder.



The illustration on the right is a typical example of where the E-Stop panel switches and E-Stop input are located. An LW300A is shown in this example with the front door open. The locations of these E-Stop functions are similarly located on the other Laser models.

An **E03: Emergency Stop** error can be caused by:

1. An activated Emergency Stop Switch
2. An activated E-Stop Ext-I/O Input
3. Faulty Power Supply
4. Faulty Component/PCB

1. An activated Emergency Stop Switch

First verify all E-Stop switches are inactive by physically rotating the switch in the "RESET" direction as shown on the switch. The number of E-Stop switches will vary among Laser Models, but all E-Stop switches must be inactive (off) for normal operation. "RESET" all switches, then press the "Trouble Reset" button. If error persists, continue with next step.

2. An activated E-Stop Ext-I/O Input

If an External Emergency Stop input is used, it will be connected to the external I/O connector "**EXT-I/O (3)**". Verify that the external E-Stop is not activated. Using a DMM verify that the connections between **Ext-I/O (3)**, pin 2 and pin 7 are closed (≈ 0 Ω). If an External Emergency Stop is not used, verify that a loop-back connector is installed on **Ext-I/O (3)** and that there is a "shorting" wire soldered between **Ext-I/O (3)**, pin 2 and pin 7.

Once the External Emergency Stop circuit is verified, press the "Trouble Reset" button. If the error persists, continue with the next step.

3. Faulty Power Supply

An **E02** error can also be caused by faulty Power Supply voltage. Usually a power supply fault will also yield other error messages as well. Using a DMM, measure the power supply voltages on the **CPU** (Main PCB) at the appropriate test points (see tables below for a list of test points). If voltages test OK, continue with the next step. If there is a problem with one or more of the power supply voltages, test and repair as outlined below:

ME-1925 CPU (Main PCB)

1. Disconnect all wiring harness connectors on the **CPU** (Main PCB) except for CN18 and CN19.
2. Retest the power supply voltages:
    a. If the +24V tests bad, measure the output voltage of the external +24V power supply (AMYA # 525-035) and replace if bad. If +24V power supply tests OK, verify input voltage on CN18. If the +24V input voltage isn't present on CN18, check the wiring harness.
    b. If the +5V or ±15V tests bad, measure the output voltages on the external +5/±15V power supply (AMYA # 525-034) and replace if bad. If the +5/±15V power supply tests OK, verify the input voltages on CN19. If a power supply voltage is not present on CN19, check the wiring harness.
    c. If the -5V, $+5V_E$, $+5V_R$, or +10V tests bad, there is a faulty component on the Main PCB. Replace **CPU** (Main PCB).
    d. If all voltages test "good", plug in each wiring harness connector back into the **CPU** (Main PCB) one at a time (turning power OFF each time). Monitor the power supply voltage that had the problem and continue this process until the problem wiring harness is identified. Note the "CN" connector number and contact Amada Miyachi America for further testing instructions.

ME-1925A/B/C – Power & Reference Supply Voltages

DMM		V_{SUPPLY}	Power Source		
+	–		Input Connection	V_{SOURCE}	Power Supply
TP1	TP3	+15V ± 0.6V	CN19-1 to CN19-4	+15V	AMYA # 525-034
TP2	TP3	+5V ± 0.2V	CN19-2 to CN19-4	+5V	
TP4	TP3	–15V ± 0.6V	CN19-3 to CN19-4	-15V	
TP5	TP8	+24V ± 0.5V	CN18-1 to CN18-4	+24V	AMYA # 525-035
TP6	TP8	-5V ± 0.2V	*Created from +24V supply (via IC2)*		
TP7	TP8	$+5V_E$ ± 0.2V	*Created from +24V supply (via IC3)*		
TP9	TP3	$+5V_R$ ± 0.01V	*Reference Voltage is derived from the +15V supply (adjustable by VR1)*		
TP21	TP3	+10 ± 0.1V	*A/D reference voltage derived from $+5V_R$*		

ME-1958 CPU (Main PCB)

1. With Laser power OFF, verify all PCB fuses (FS1 - FS5) are intact. Replace any blown fuse.
2. Disconnect all wiring harness connectors on the **CPU** (Main PCB) except for CN1 and CN2.
3. Power Laser ON and recheck fuses. If any fuse blows during the power on sequence, there is a faulty component on the Main PCB. Replace **CPU** (Main PCB).
4. If fuses remain intact, Retest the power supply voltages:
    a. If the +24V tests bad, measure the output voltage of the external +24V power supply (AMYA # 525-037) and replace if bad. If +24V power supply tests OK, verify input voltage on CN2. If the +24V input voltage isn't present on CN2, check the wiring harness.
    b. If the ±5V, ±15V, +11V, $+5V_E$, $+5V_R$ or +10V voltages test bad, verify that the A.C. input voltages are present on CN1. If the input voltages test OK, there is a faulty component on the Main PCB. Replace **CPU** (Main PCB). If the input voltages are not present check the wiring harness.
    c. If all voltages test OK, plug in each wiring harness connector back into the **CPU** (Main PCB) one at a time (turning power OFF each time). Monitor the power supply voltage that had the problem and continue this process until the problem wiring harness is identified. Note the "CN" connector number and contact Amada Miyachi America for further testing instructions.

ME-1958A/B/C – Power & Reference Supply Voltages

DMM		V_{SUPPLY}	Power Source		Protection Fuse		
+	–		Input Connection	V_{SOURCE}	Fuse	Value	AMYA #
TP1	TP3	+11V ± 2.5V	CN1-1 to CN1-2	9VAC	FS1	1A	330-182
TP2	TP3	+5V ± 0.2V					
TP4	TP3	–5V ± 0.2V	CN1-3 to CN1-2	9VAC	FS2	1A	330-182
TP5	TP3	+15V ± 0.6V	CN1-4 to CN1-5	18VAC	FS3	2A	330-198
TP7	TP3	–15V ± 0.6V	CN1-6 to CN1-5	18VAC	FS4	2A	330-198
TP8	TP9	$+5V_E$ ± 0.2V	CN1-7 to CN1-8	9VAC	FS5	1A	330-182
TP10	TP9	+24V ± 0.5V	CN2-1 to CN2-4	24VDC	*Ext Power Supply (AMY # 525-037)*		
TP11	TP3	$+5V_R$ ± 0.01V	*A/D Reference Voltage is derived from the +15V supply (adjustable by VR1)*				
TP15	TP3	+10 ± 0.1V	*A/D reference voltage derived from $+5V_R$*				

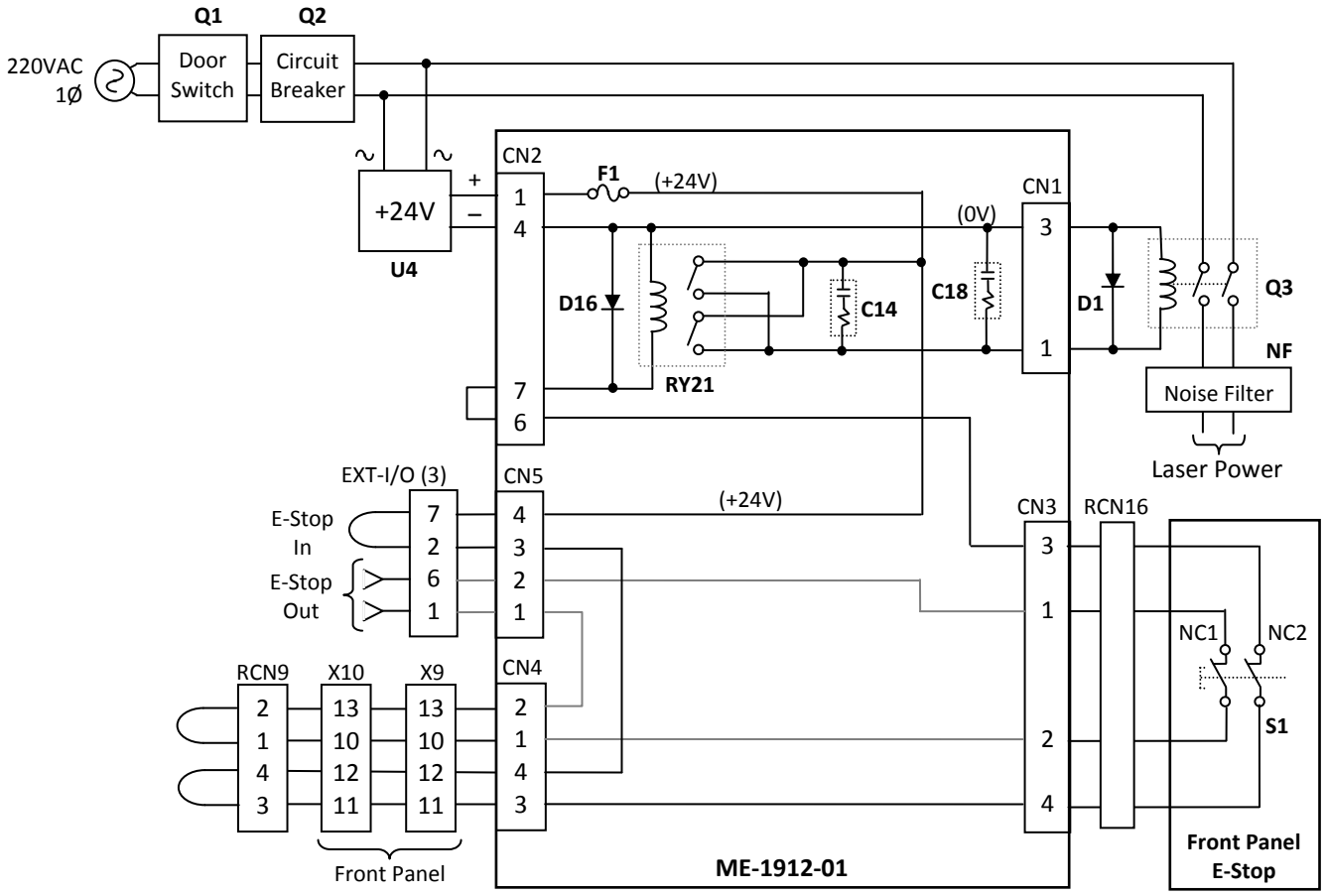
4. Faulty Component/PCB

If all user-settable Emergency Stop inputs and power supply voltages have been verified, use a DMM to verify the integrity of the E-Stop circuit as outlined in the schematics below. Replace faulty component(s) and then verify the E-Stop function. A component locator can be found at the end of this document to aid in identifying the location of the pertinent components. Note that depending on the date of manufacture the actual location of any given component may be slightly different than shown in the component locators shown below.

Notes: 1. In the schematics below, all RCNx connectors are free hanging cable-to-cable connectors.
2. In order to access some of the components, a protective cover may need to be removed.

If the problem still persists, contact Amada Miyachi America Service.

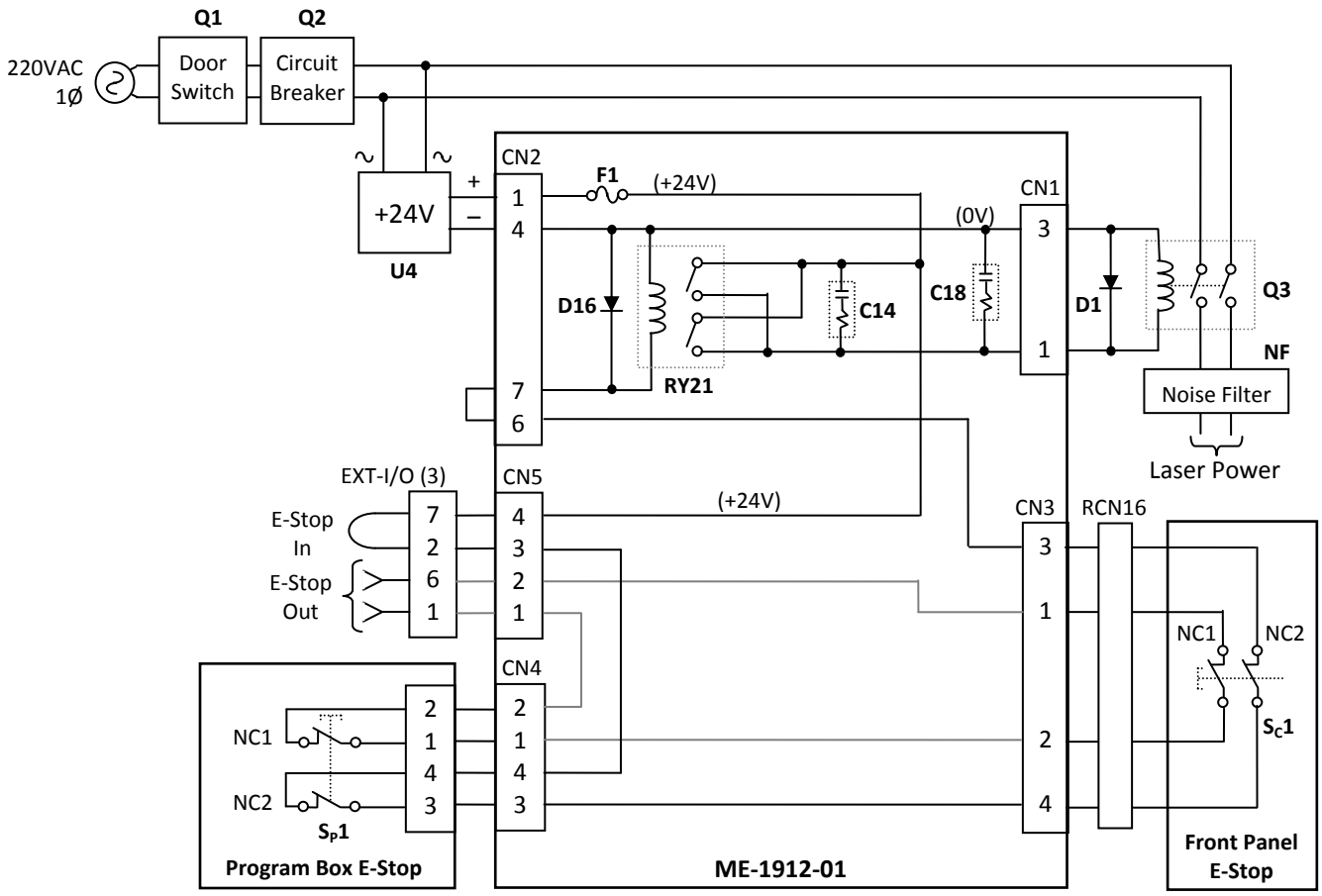
LW2AG(E) Laser Welders – E-Stop Circuit
(*note: obsolete model*)



LW2AG(E) E-Stop Components:

Ref	Description	Manufacturer P/N	AMYA #
Q1	Door Switch (P-Type Load)	Klockner-Moeller TM-1-8291/E/SVB-SW	680-427
Q2	GFI Circuit Breaker	Matsushita BJS153100F1	240-160
Q3	DPST N.O. Relay, 24V Coil	Matsushita HE2aN-S-DC24V	555-172
NF	Noise (EMI) Filter	Nemic Lambda MB1210	270-301
U4	+24V E-Stop Power Supply	Cosel LDA10F-24	525-036
F1	2A Fuse (normal blow)	Littelfuse 218 002P	330-198
D1/16	400V, 1A Rectifier Diode	SynSemi 1S1887	*Special Order*
RY21	DPST Relay, 24V Coil	Omron G6B-2214P-FD-US DC24V	*Special Order*
C14, C18	RC Surge Suppressor	Panasonic ECQJ0187Y(F)	*Special Order*
S1	E-Stop Panel Switch	Omron A-165E-S-02	680-316

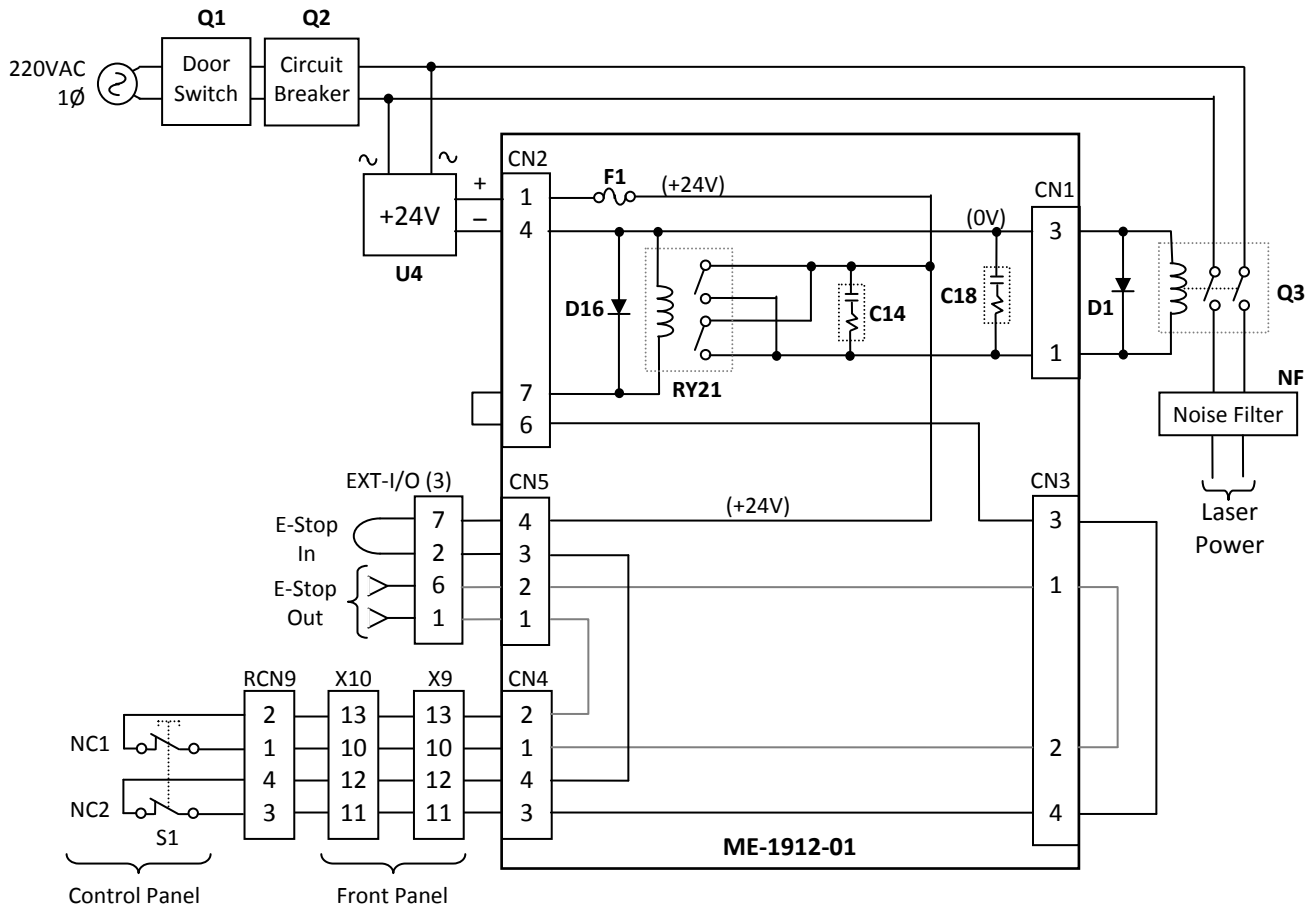
LW5AG(E) Laser Welders – E-Stop Circuit



LW5AG(E) E-Stop Components:

Ref	Description	Manufacturer P/N	AMYA #
Q1	Door Switch (P-Type Load)	Klockner-Moeller TM-1-8291/E/SVB-SW	680-427
Q2	GFI Circuit Breaker	Matsushita BJS153100F1	240-160
Q3	DPST N.O. Relay, 24V Coil	Matsushita HE2aN-S-DC24V	555-172
NF	Noise (EMI) Filter	Nemic Lambda MB1210	270-301
U4	+24V E-Stop Power Supply	Cosel LDA10F-24	525-036
F1	2A Fuse (normal blow)	Littelfuse 218 002P	330-198
D1/16	400V, 1A Rectifier Diode	SynSemi 1S1887	*Special Order*
RY21	DPST Relay, 24V Coil	Omron G6B-2214P-FD-US DC24V	*Special Order*
C14, C18	RC Surge Suppressor	Panasonic ECQJ0187Y(F)	*Special Order*
S_P1, S_C1	E-Stop Panel Switch	Omron A-165E-S-02	680-316

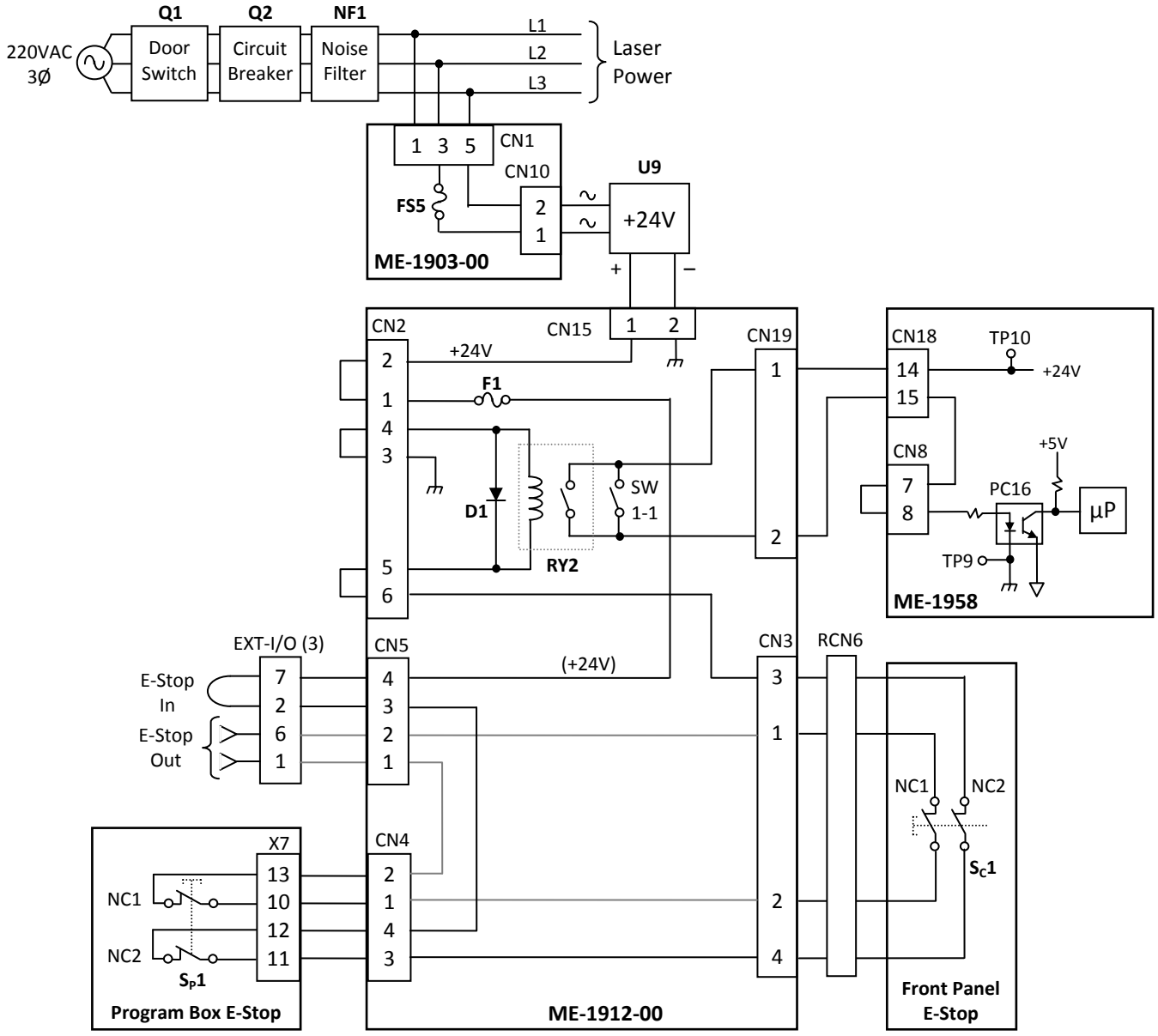
LW5A(E)/5AM(E)/15A(E)/25A(E) Laser Welders – E-Stop Circuit



LW5A(E)/5AM(E)/15A(E)/25A(E) E-Stop Components:

Ref	Description	Manufacturer P/N	AMYA #
Q1	Door Switch (P-Type Load)	Klockner-Moeller TM-1-8291/E/SVB-SW	680-427
Q2	GFI Circuit Breaker	Matsushita BJS153100F1	240-160
Q3	DPST N.O. Relay, 24V Coil	Matsushita HE2aN-S-DC24V	555-172
NF	Noise (EMI) Filter	Nemic Lambda MB1210	270-301
U4	+24V E-Stop Power Supply	Cosel LDA10F-24	525-036
F1	2A Fuse (slow blow)	Littelfuse 218 002P	330-198
D1, D16	400V, 1A Rectifier Diode	SynSemi 1S1887	*Special Order*
RY21	DPST Relay, 24V Coil	Omron G6B-2214P-FD-US DC24V	*Special Order*
C14, C18	RC Surge Suppressor	Panasonic ECQJ0187Y(F)	*Special Order*
S1	E-Stop Panel Switch	Omron A-165E-S-02	680-316

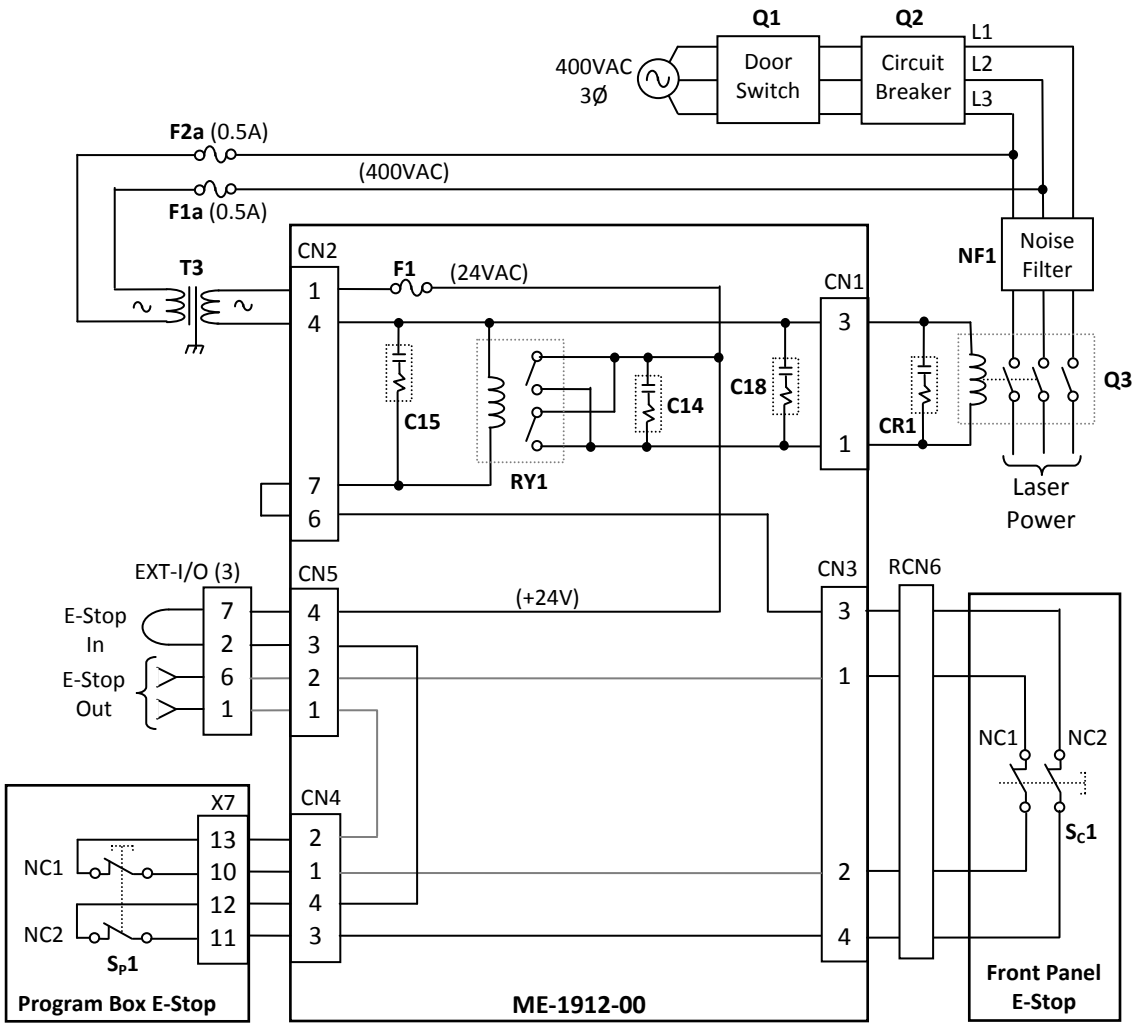
LW50A/50AC/70A/70AC/150A Laser Welders – E-Stop Circuit



LW50A/50AC/70A/70AC/150A E-Stop Components:

Ref	Description	Manufacturer P/N	AMYA #
Q1	Door Switch (P-Type Load)	Klockner-Moeller P1-25/V/SVB-SW	680-428
Q2	GFI Circuit Breaker (new)	Mitsubishi NV63CW3P20A100-440V1.2.500MACE	240-162
	(old)	Mitsubishi-Denki NV50-CW 3P 20A F CE	240-162
NF1	3Ø AC Noise Filter	Tamura FS3010L-P	270-277
U9	+24V E-Stop P.S. (new)	Densei-Lambda ZWS100AF-24/J	525-037
	(old)	Omron S82J-15024D	N/A
FS5	3A Fuse (normal blow)	FA-Ubon 2GF-3	*Special Order*
F1	2A Fuse (slow blow)	Littelfuse 218 002P	330-198
D1	400V, 1A Rectifier Diode	SynSemi 1S1887	*Special Order*
RY2	DPST Relay, 24V Coil	Omron G6B-2214P-FD-US DC24V	*Special Order*
S_P1, S_C1	E-Stop Panel Switch	Omron A-165E-S-02	680-316

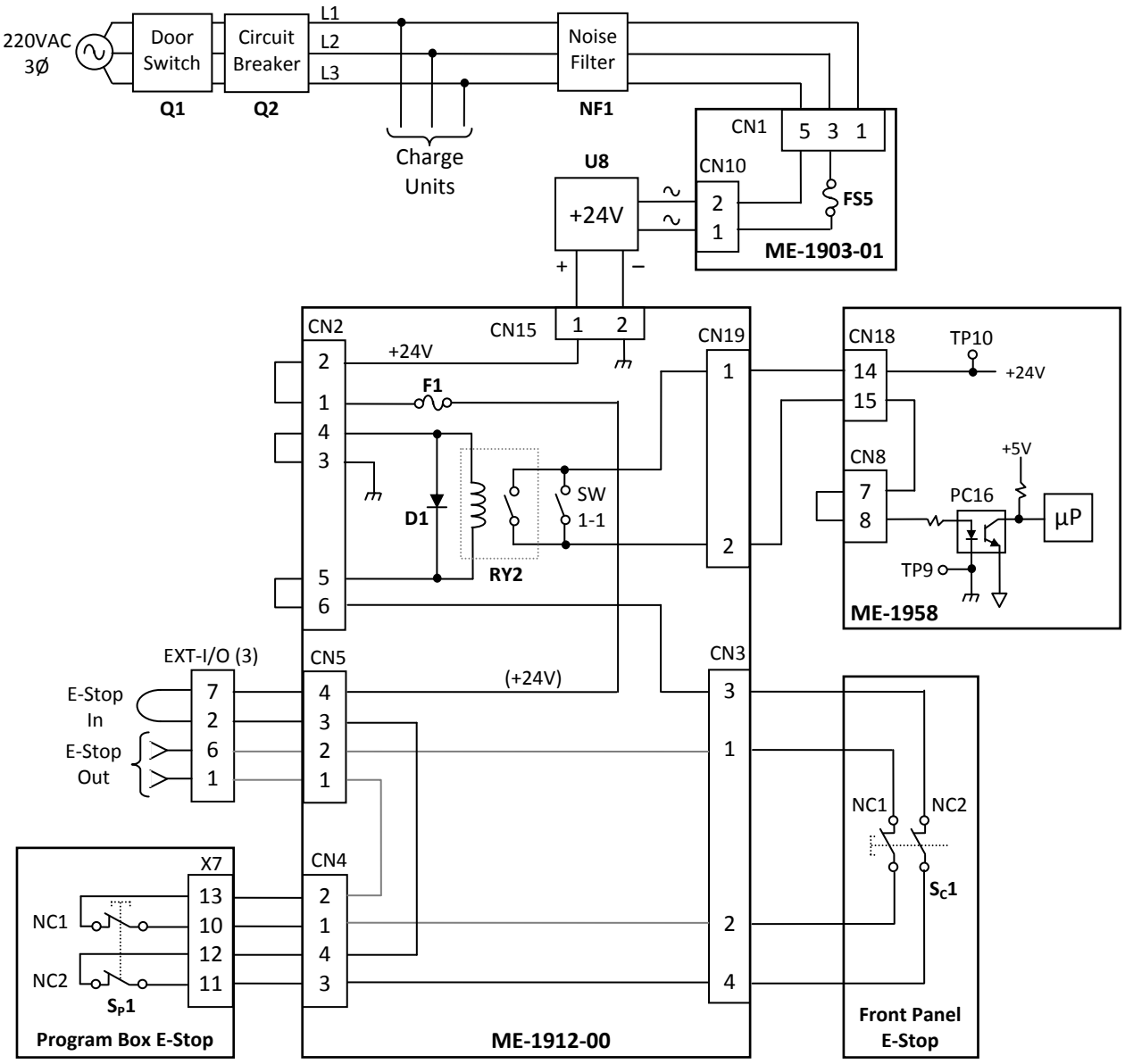
LW50AE/50ACE/70AE/70ACE/150AE Laser Welders – E-Stop Circuit



LW50AE/50ACE/70AE/70ACE/150AE E-Stop Components:

Desig	Description	Manufacturer P/N	AMYA #
Q1	Door Switch (P-Type Load)	Klockner-Moeller P1-25/V/SVB-SW	680-428
Q2	GFI Circuit Breaker	Mitsubishi-Denki NV50-CW 3P 10A F CE	*Special Order*
Q3	3Ø Contactor	Fuji-Denki SC-4-1 AC24V 1a	555-173
NF1	3Ø AC Noise Filter	Tamura 3SUP-C10H-ER-4	*Special Order*
T3	24VAC step-down transformer	MHC T-2444	*Special Order*
F1a, F2a	½A 500V Fuse (slow blow)	Bussmann FNQ-1/2	330-143
F1	2A Fuse (slow blow)	Littelfuse 218 002P	330-198
C14, C15, C18, CR1	RC Surge Suppressor	Panasonic ECQJ0187Y(F)	*Special Order*
RY1	DPDT Relay	Omron G2R-2 AC24V	*Special Order*
S_P1, S_C1	E-Stop Panel Switch	Omron A-165E-S-02	680-316

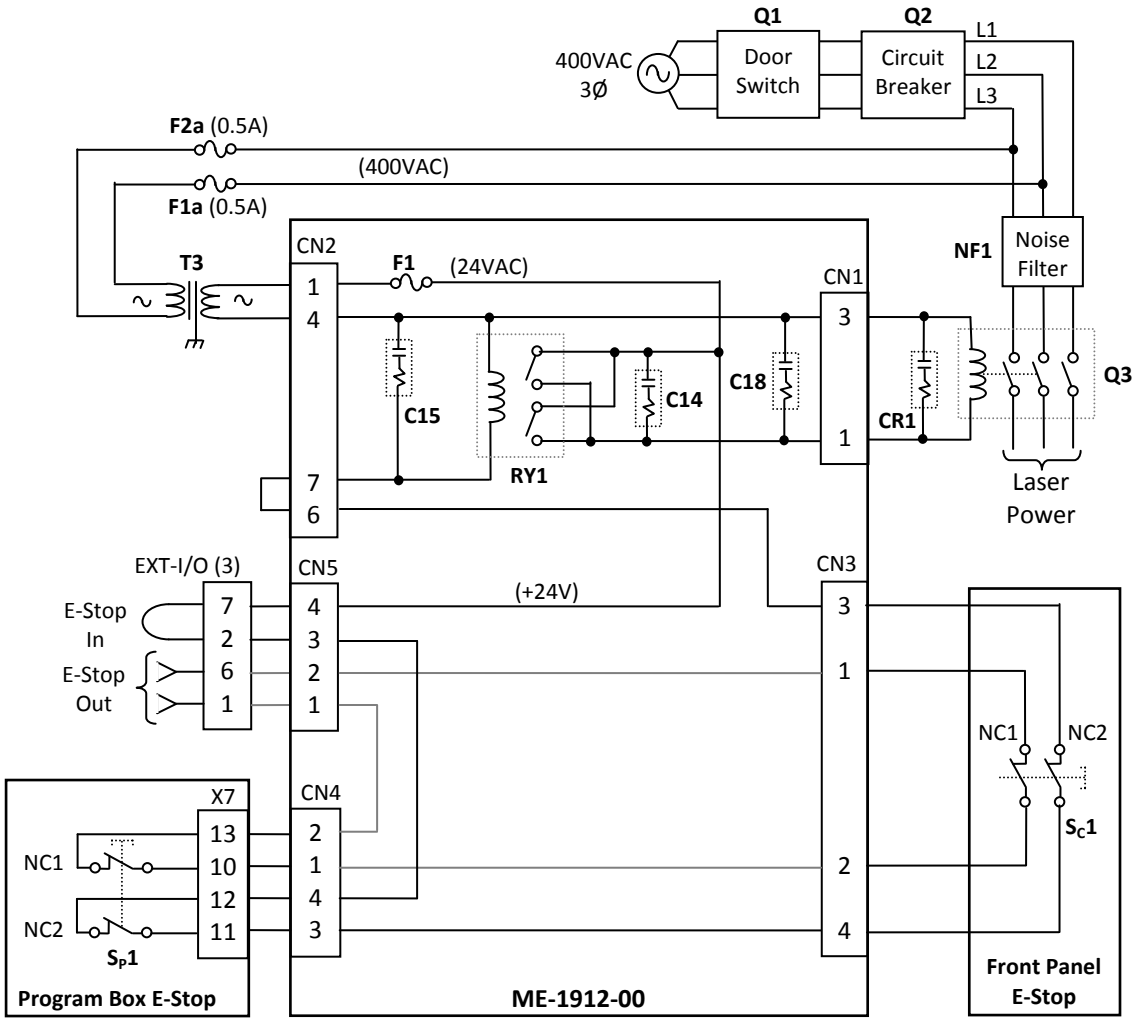
LW300A/300AH/400A Laser Welders – E-Stop Circuit



LW300A/300AH/400A E-Stop Components:

Ref	Description	Manufacturer P/N	AMYA #
Q1	Door Switch (P-Type Load)	Klockner-Moeller P3-63/V/SVB-SW	680-411
Q2	GFI Circuit Breaker	Mitsubishi NV50-CW 3P 50A F IEC	*Special Order*
NF1	3Ø AC Noise Filter	Tamura FS3010L-P	270-277
U8	+24V E-Stop Power Supply	Omron S82J-10024A	*Special Order*
FS5	1A Fuse (slow blow)	Littelfuse 313 001	330-017
F1	2A Fuse (slow blow)	Littelfuse 218 002P	330-198
D1	400V, 1A Rectifier Diode	SynSemi 1S1887	*Special Order*
RY2	DPST Relay, 24V Coil	Omron G6B-2214P-FD-US DC24V	*Special Order*
S_P1, S_C1	E-Stop Panel Switch	Omron A-165E-S-02	680-316

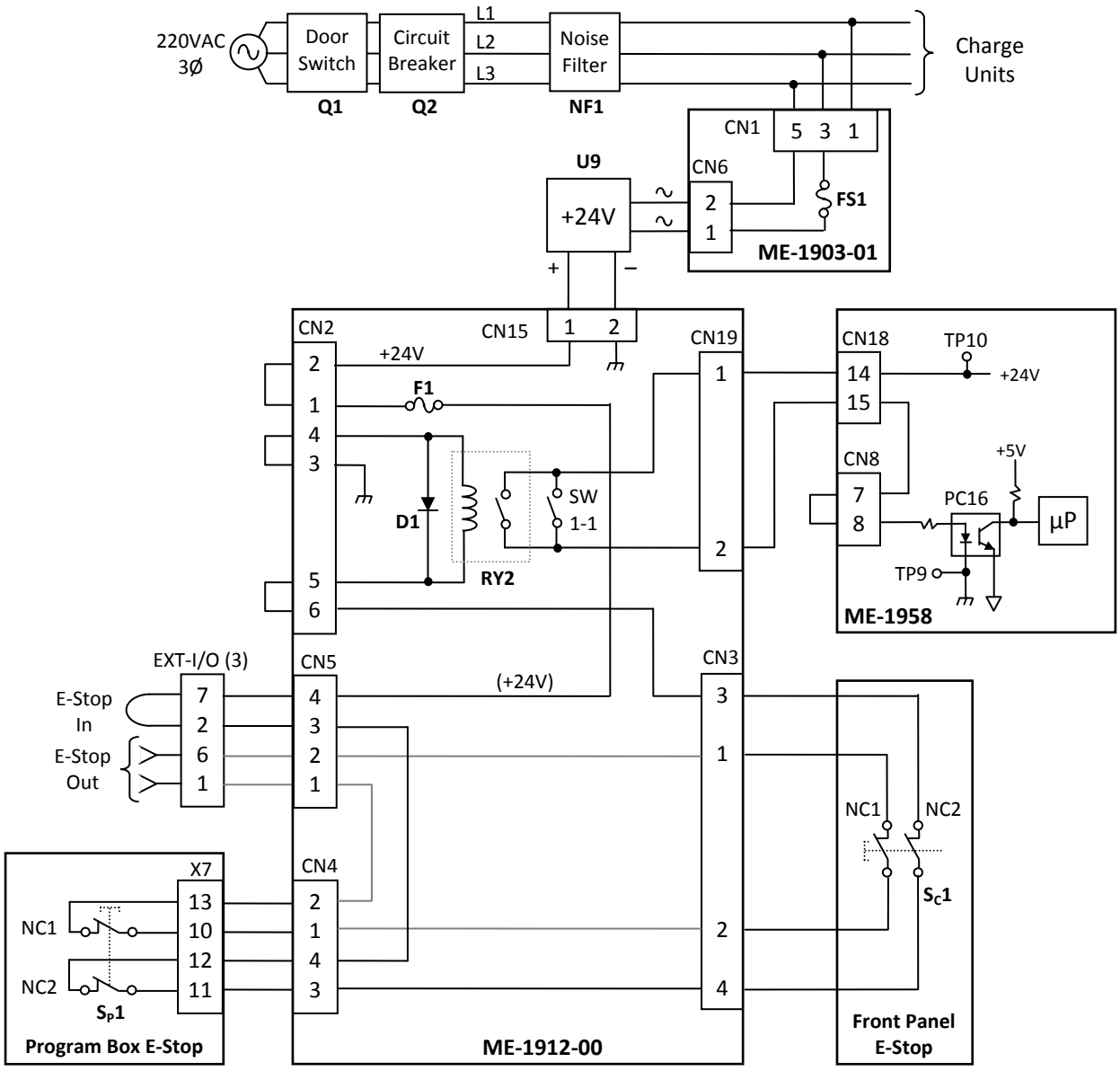
LW300AE/300AHE/400AE Laser Welders – E-Stop Circuit



LW300AE/300AHE/400AE E-Stop Components:

Desig	Description	Manufacturer P/N	AMYA #
Q1	Door Switch (P-Type Load)	Klockner-Moeller P3-63/V/SVB-SW	680-411
Q2	GFI Circuit Breaker (new)	Mitsubishi NV63CW3P20A100-440V1.2.500MACE	240-158
	(old)	Mitsubishi NV50-CW 3P 30A F IEC	240-161
Q3	3Ø Contactor	Fuji-Denki SC-N2 Coil AC24V 2a2b (RoHS)	*Special Order*
NF1	3Ø AC Noise Filter	Tamura 3SUP-C30H-ER-4	*Special Order*
T3	24VAC step-down transformer	MHC T-2303	*Special Order*
F1a, F2a	½A 500V Fuse (slow blow)	Bussmann FNQ-1/2	330-143
F1	2A Fuse (slow blow)	Littelfuse 218 002P	330-198
C14, C15, C18, CR1	RC Surge Suppressor	Panasonic ECQJ0187Y(F)	*Special Order*
RY1	DPDT Relay	Omron G2R-2 AC24V	*Special Order*
S_P1, S_C1	E-Stop Panel Switch	Omron A-165E-S-02	680-316

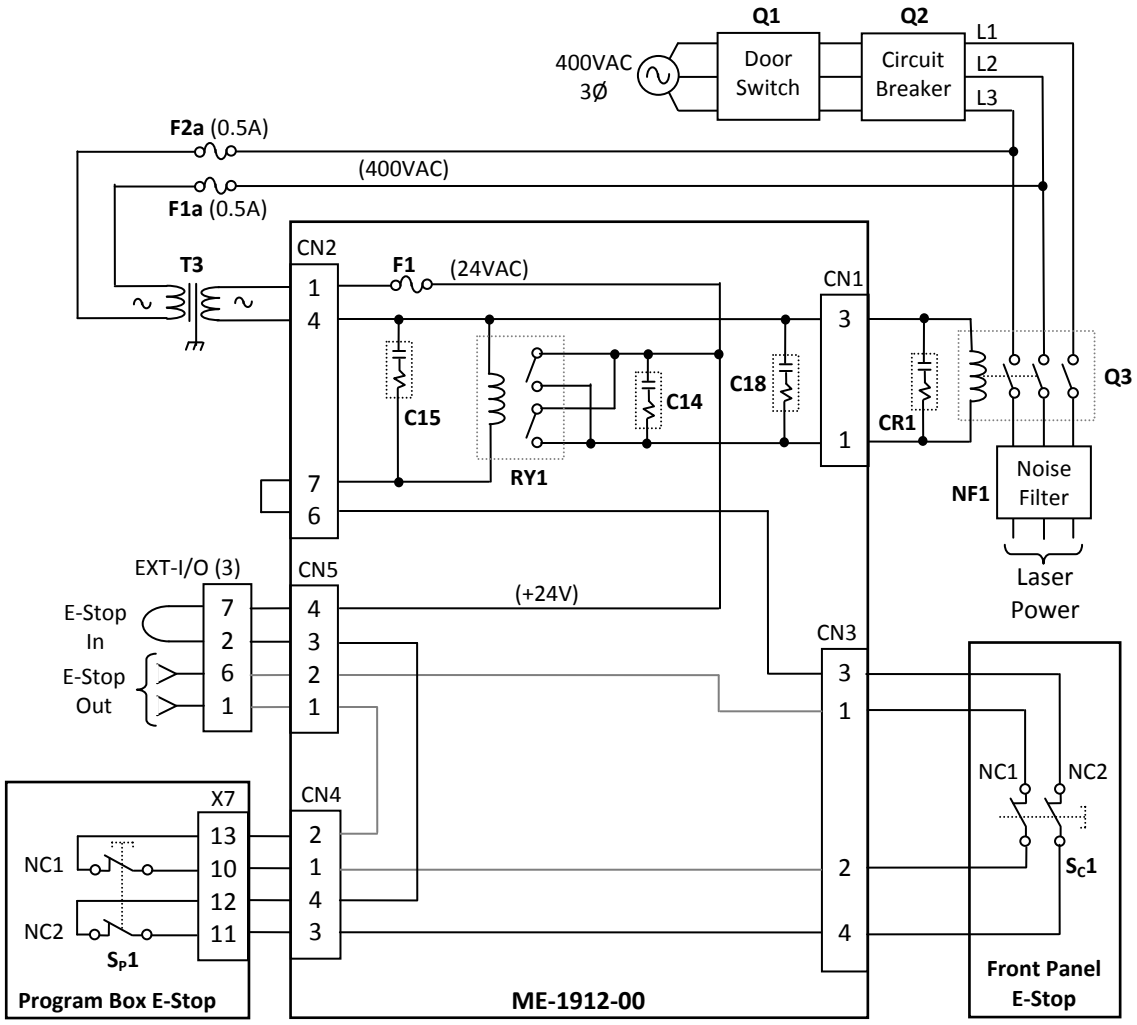
LW500A/600A Laser Welders – E-Stop Circuit



LW500A/600A E-Stop Components:

Ref	Description	Manufacturer P/N	AMYA #
Q1	Door Switch (P-Type Load)	Klockner-Moeller P3-100/V/SVB-SW	680-410
Q2	GFI Circuit Breaker (new)	Fuji EG103B 3Ø3W 100A	*Special Order*
	(old)	Mitsubishi NV100-CP	240-081
NF1	3Ø AC Noise Filter	Okaya 3SUP-W100H-ER-4	270-266
U9	+24V E-Stop Power Supply	Omron S82J-10024D2	*Special Order*
FS1	3A Fuse (slow blow)	Littelfuse 313 003	330-181
F1	2A Fuse (slow blow)	Littelfuse 218 002P	330-198
D1	400V, 1A Rectifier Diode	SynSemi 1S1887	*Special Order*
RY2	DPST Relay, 24V Coil	Omron G6B-2214P-FD-US DC24V	*Special Order*
S_P1, S_C1	E-Stop Panel Switch	Omron A-165E-S-02	680-316

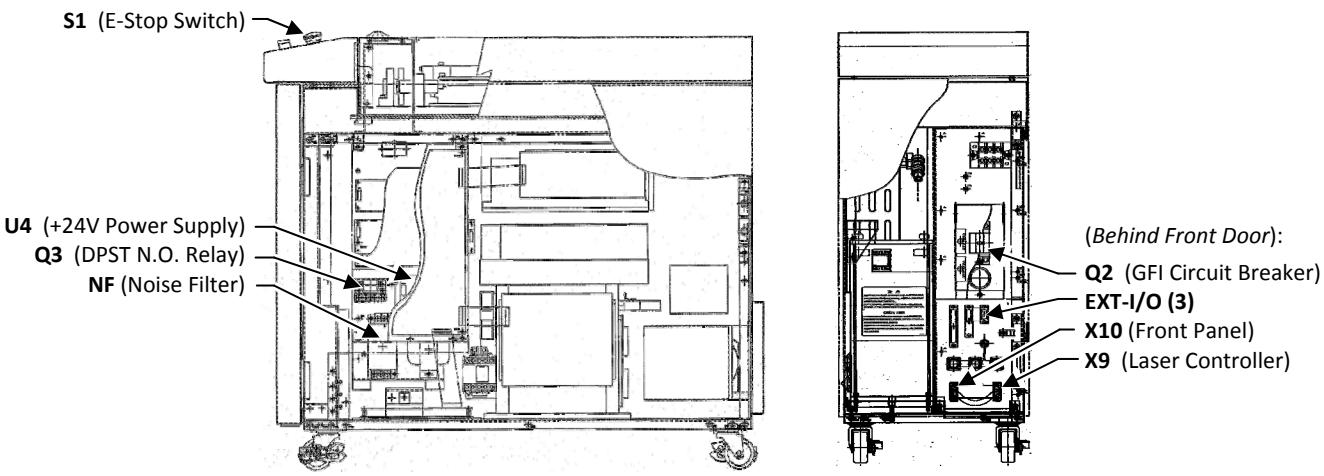
LW500AE/600AE Laser Welders – E-Stop Circuit



LW500AE/600AE E-Stop Components:

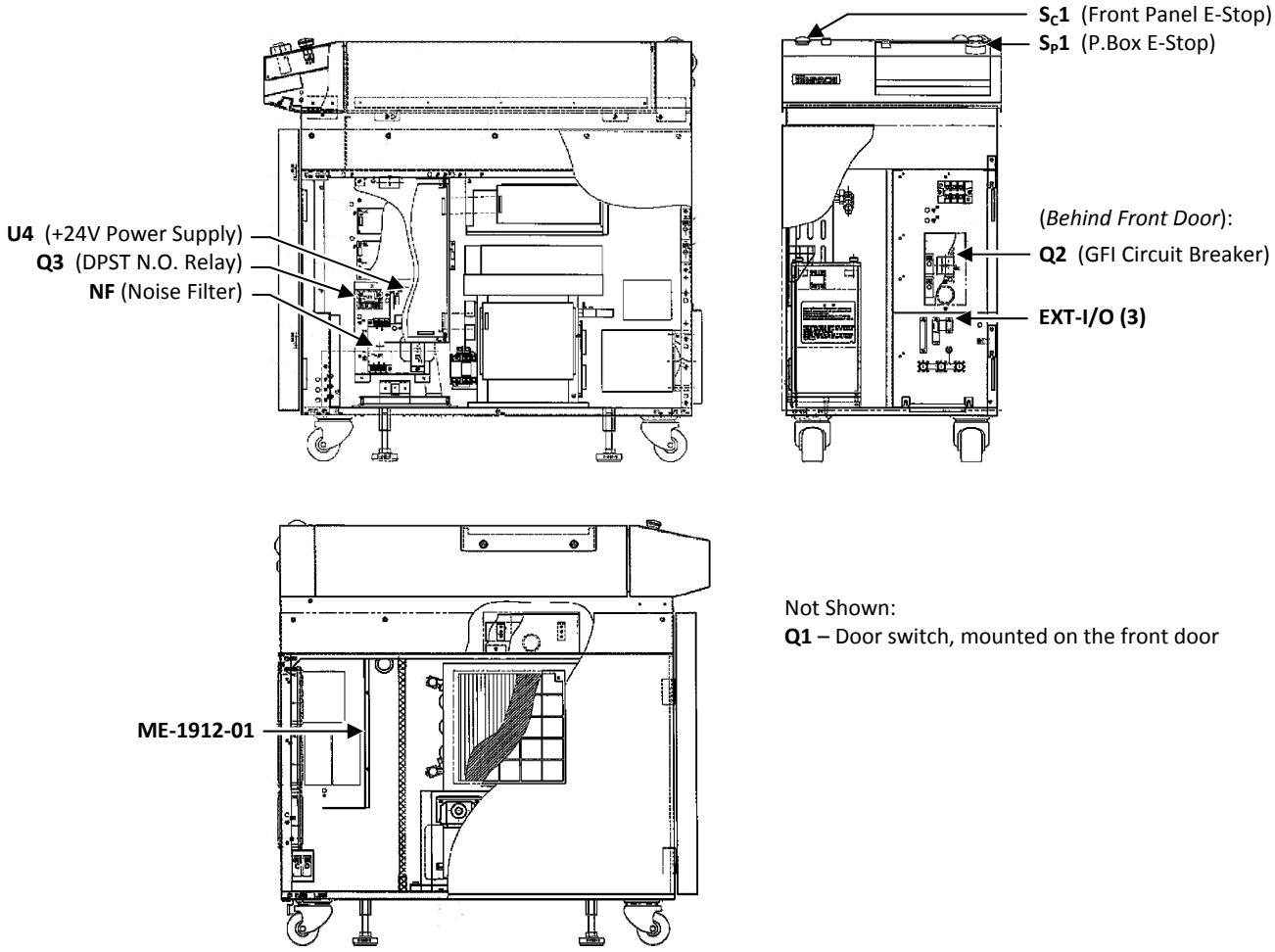
Desig	Description	Manufacturer P/N	AMYA #
Q1	Door Switch (P-Type Load)	Klockner-Moeller P3-100/V/SVB-SW	680-410
Q2	GFI Circuit Breaker (new)	Mitsubishi NV63-CW3P60A100-440v1.2.500MACE	240-198
	(old)	Mitsubishi NV60CW3P60A230-400-440V500mAF	240-193
Q3	3Ø Contactor	Fuji-Denki SC-3N AC24V 1a	*Special Order*
NF1	3Ø AC Noise Filter	Timonta FMAC-0953-6410	*Special Order*
T3	24VAC step-down transformer	MHC T-2303	*Special Order*
F1a, F2a	½A 500V Fuse (slow blow)	Bussmann FNQ-1/2	330-143
F1	2A Fuse (slow blow)	Littelfuse 218 002P	330-198
C14, C15, C18, CR1	RC Surge Suppressor	Panasonic ECQJ0187Y(F)	*Special Order*
RY1	DPDT Relay	Omron G2R-2 AC24V	*Special Order*
S_P1, S_C1	E-Stop Panel Switch	Omron A-165E-S-02	680-316

LW2AG(E) Component Locator



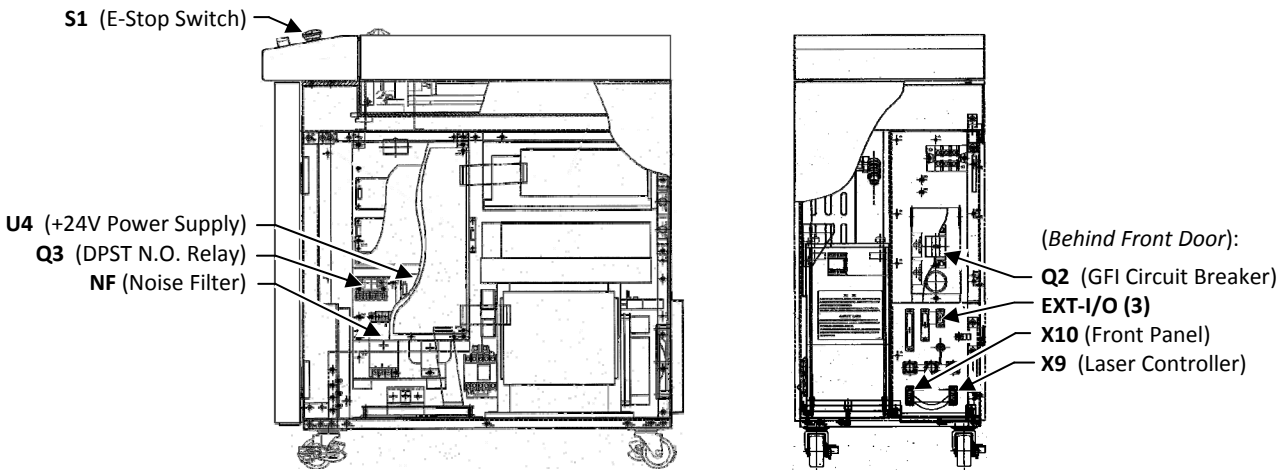
Not Shown: **ME-1912-01** – Located behind the ME-1925 Main PCB
Q1 – Door switch, mounted on the front door

LW5AG(E) Component Locator



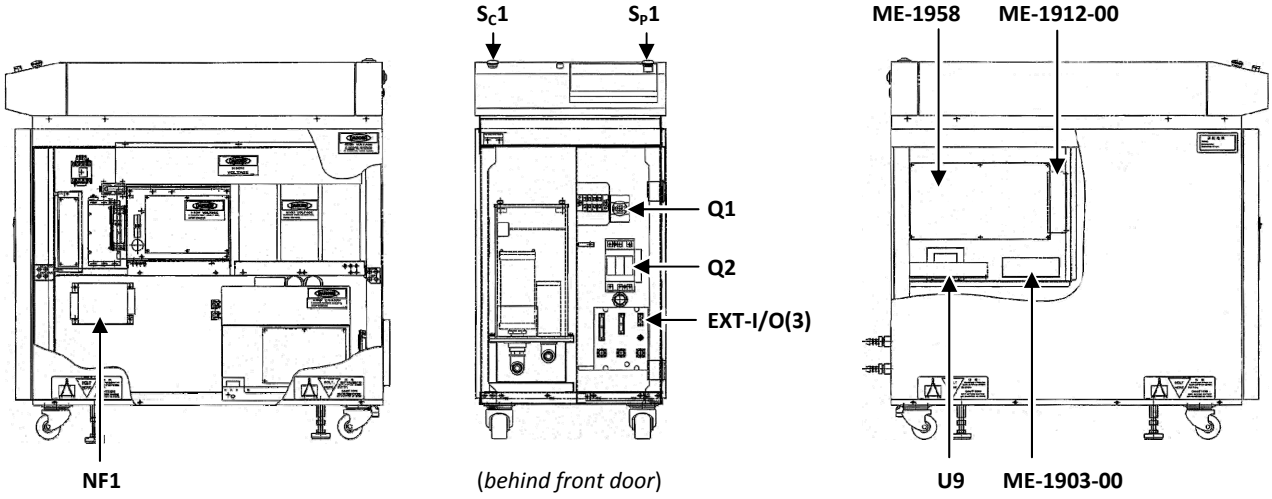
Not Shown:
Q1 – Door switch, mounted on the front door

LW5A(E)/5AM(E)/15A(E)/25A(E) Component Locator

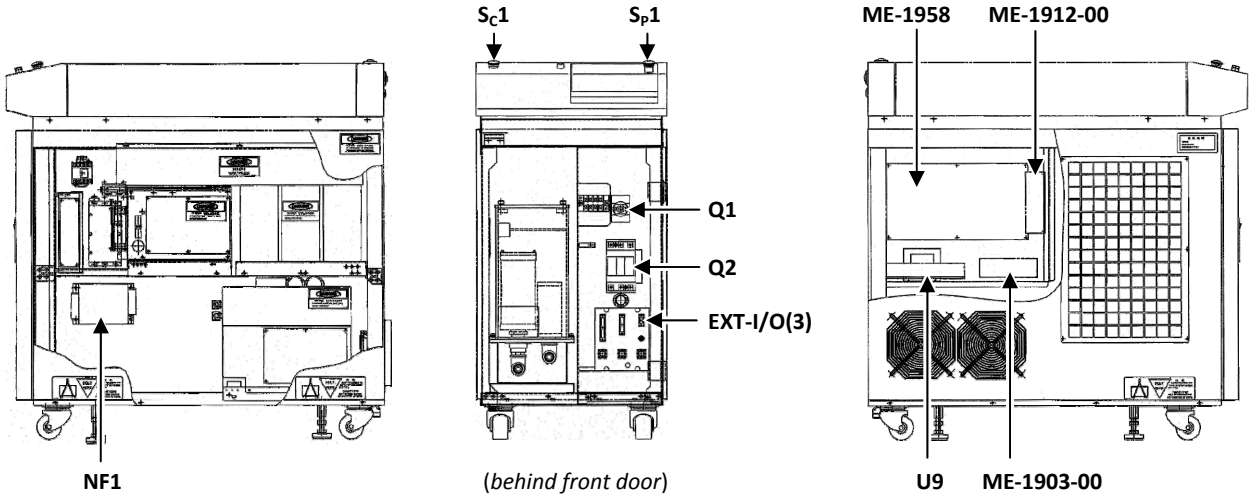


Not Shown: **ME-1912-01** – Located behind the ME-1925 Main PCB
Q1 – Door switch, mounted on the front door

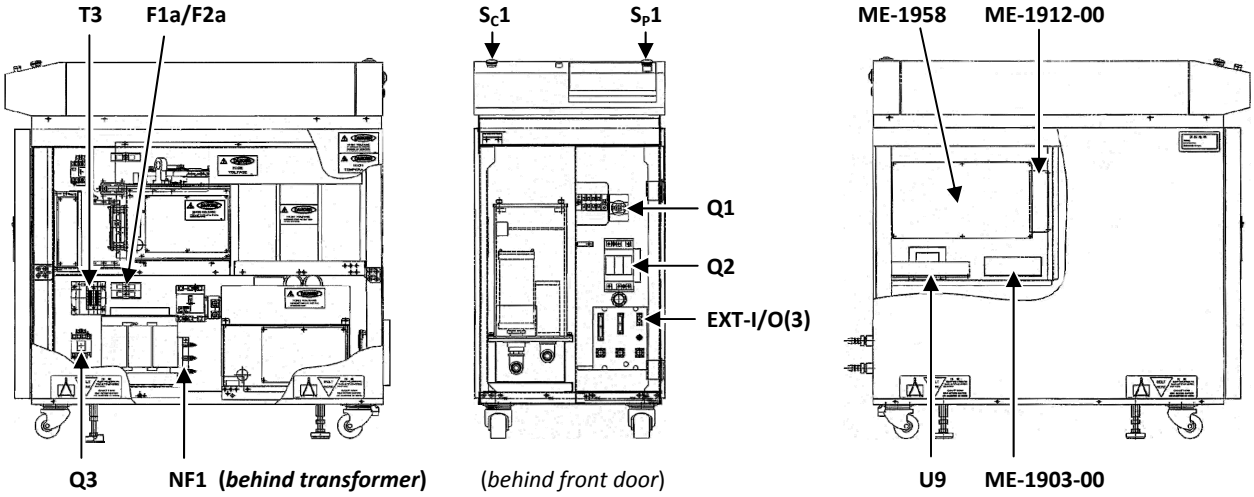
LW50A/70A/150A Component Locator



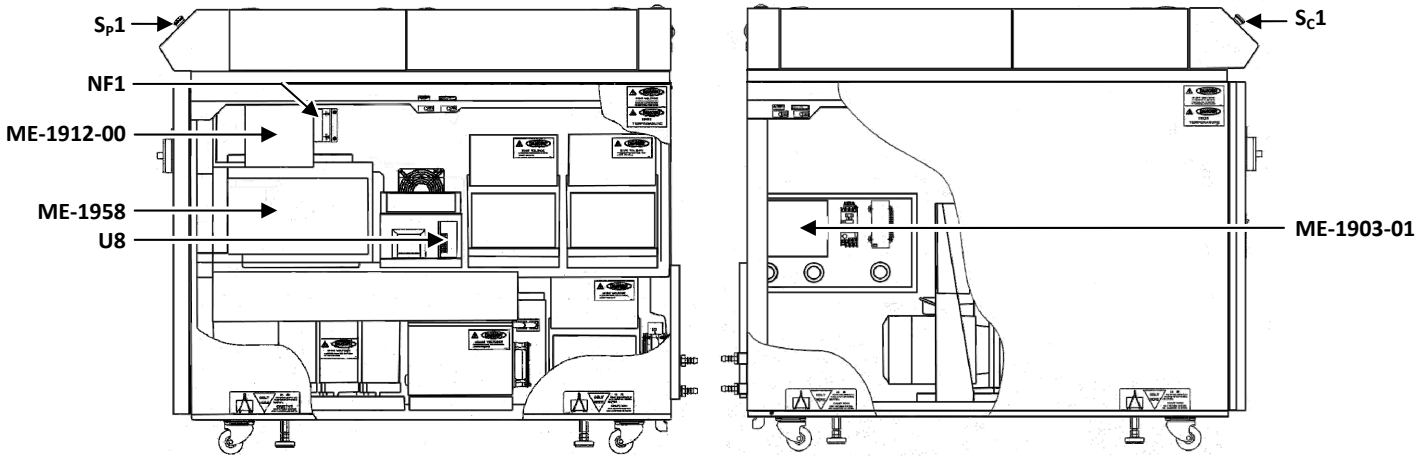
LW50AC/70AC Component Locator



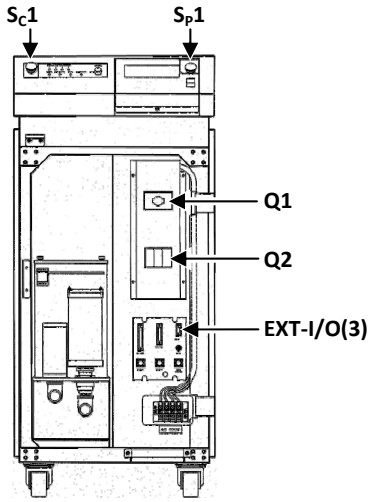
LW50AE/70AE/150AE Component Locator



LW300A(H)/400A Component Locator

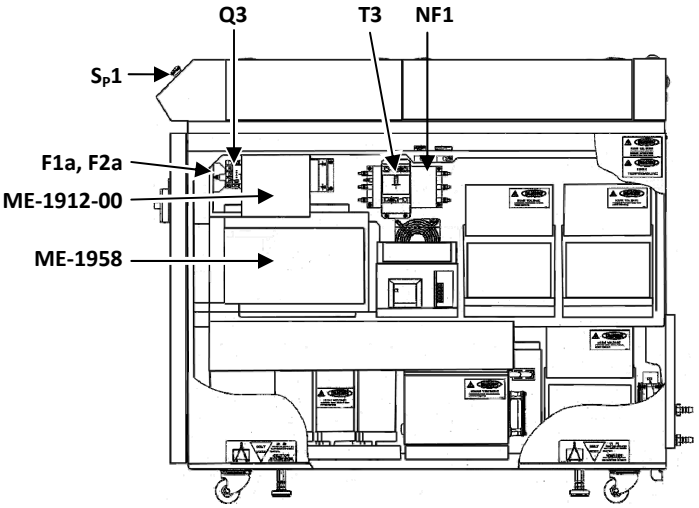


LW300A(H)(E)/400A(E) Component Locator

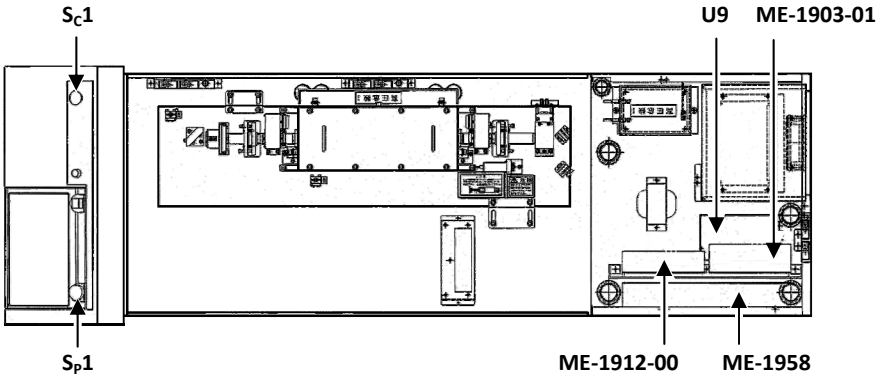


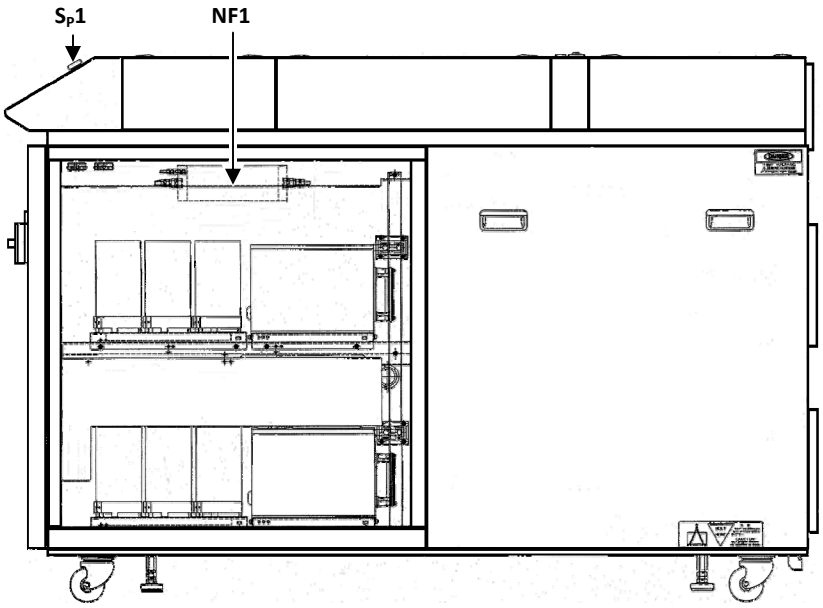
(*behind front door*)

LW300A(H)E/400AE Component Locator

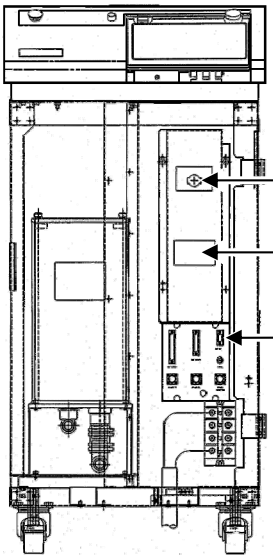


LW500A/600A Component Locator



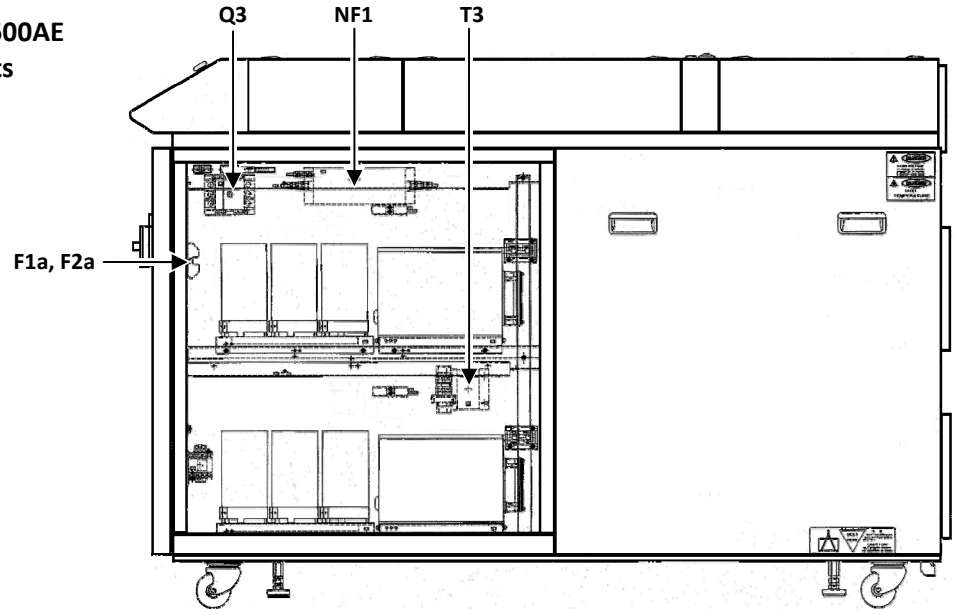


LW500A(E)/600A(E) - common

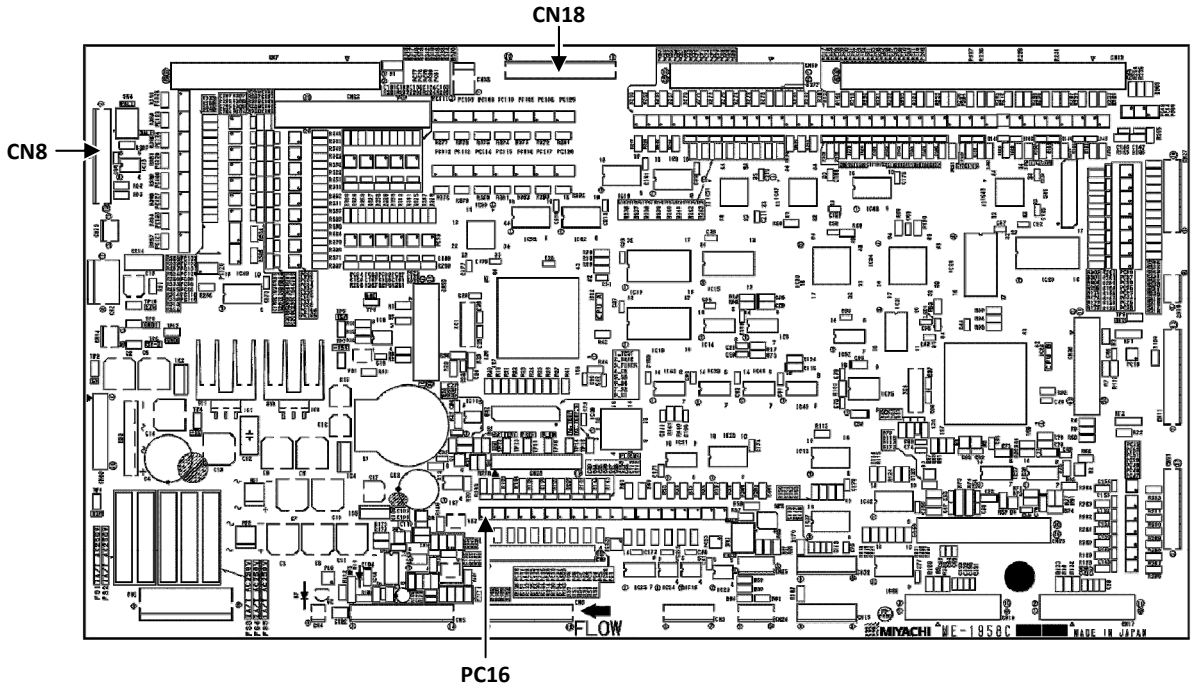


(*behind front door*)

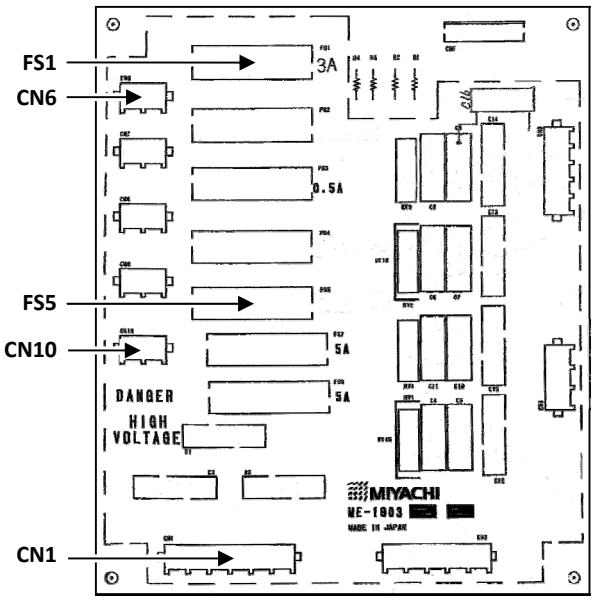
LW500AE/600AE Components



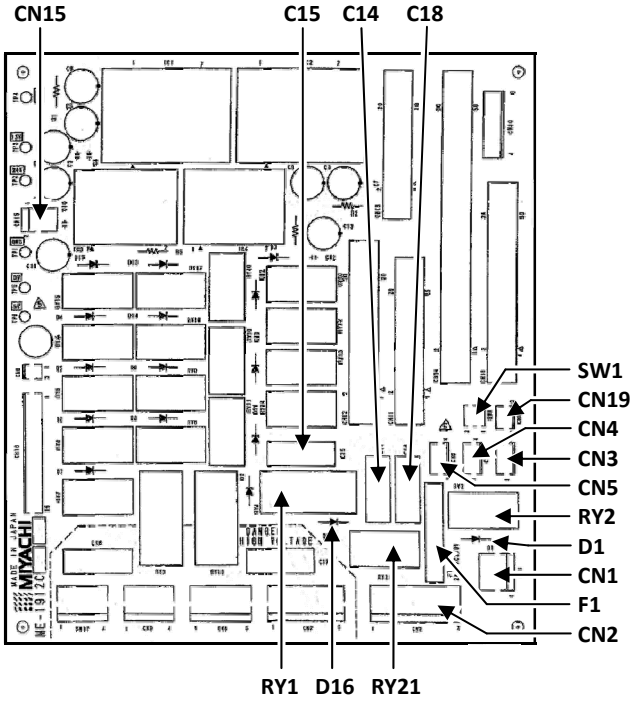
ME-1958A Layout:



ME-1903-xx SSR PCB Layout:



ME-1912-xx Interlock PCB Layout:



End of procedure