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MULTI-SCREEN Model MUSC-1S6-02906

Supplement to Primary Instruction Manual 42492
for Systems with MSA-RM-6 Relay Module

WARNING . . .
It is very important to keep this document with its associated manual.
It contains information critical to the operation of the MULTI-SCREEN Systems.

Description

The associated control box is a special modification of the MULTI-SCREEN controller to include the 6NO relay module (MSA-RM-6), the addition of trip/latch select, and the addition of quick disconnects for Emitter, Receiver, and machine interface.

The MUSC-1S6-02906 control box replaces the "Auto Power-up" feature with "TRIP/LATCH Output Select." **Any reference to "Auto Power-up" in the primary instruction manual has been replaced as follows or should be now considered "TRIP Output."**

Examples:

- "Auto Power-up is ON" becomes "TRIP Output has been selected," or
- "Auto Power-up is OFF" becomes "LATCH Output has been selected."

The information contained in this supplement either replaces or supplements some of the material in those manuals. **It is very important to keep this document with its associated manual.** Both contain information critical to the operation of this MULTI-SCREEN Safety Light Screen system.

A section number or figure number will be listed, followed by the word "replacement" or "addition". If an item is a replacement, that entire item is to be replaced with the information that follows and the material contained within the original manual is to be ignored. If the item is an addition, the material in the original manual is still valid, in addition to the material contained in this supplement.

Section 2 Addition

2. Overview of MULTI-SCREEN System Operation

Remove reference to "Auto Power-up (Section 2.2)" [second bullet item] and replace with "Trip/Latch Output Select" (Section 2.2(s)).

Section 2.2 Replacement

2.2 (s) Trip/Latch Output Select

The MUSC-1S6-02906 control box can be configured for Trip Output (automatic reset) or Latch Output (monitored manual reset) via a pair of DIP switches located on the controller module inside the control box. See Figure 20 of the primary manual and Section 3.4(s) in this supplement.

Trip Output
Upon power-up, when the controller module has been configured for Trip Output, the FSD and SSD outputs will automatically close once power is applied, the self-test is accomplished, and the defined area is clear. If the defined area is blocked at power-up, only the SSD closes. The FSD Outputs will close once the interruption of the defined area is removed (a GREEN condition). In either case, no external input or reset is required.

Trip Output is typically used only in situations where the individual is continually sensed by the defined area or in situations where supplemental safeguards prevent the initiation of hazardous motion while an individual is within the safeguarded space. See Section 3.2.1.1(s) “Pass-through hazards.”

A manual reset must still be performed to recover from a lockout condition.

Latch Output
Upon power-up, when the controller module has been configured for Latch Output, the SSD output will automatically close once power is applied, and the self-test is accomplished.

For the FSD Outputs to close, the defined area must be clear of interruptions (a GREEN condition) and a monitored manual reset must be accomplished (e.g. a key reset). To perform a monitored manual reset, close the “KEY 1/KEY 2” input for approximately 1/2 to 2 seconds, and then re-open the input. The FSD Outputs will close once the “open-close-open” action occurs.

The MULTI-SCREEN controller must be manually reset after power-up and after any interruptions of the defined area are cleared. The location for the manual reset (e.g. a normally open key switch) must comply with the warning in Section 2.10(s).

Latch Output is typically used in situations where the individual can pass through the sensing field and become clear such that the MULTI-SCREEN can not prevent hazardous motion. See Section 3.2.1.1(s) “Pass-through hazards.”

WARNING . . .
Initiation of Dangerous Motion

Application of the MULTI-SCREEN System must not initiate dangerous machine motion. Machine control circuitry must be designed so that one or more initiation devices must be engaged to start the machine, after the MULTI-SCREEN is placed into RUN mode (closes its FSD outputs).

Section 2.9 Addition

2.9(s) MSA-RM-6 Relay Module (6NO)

The MSA-RM-6 relay module has six normally open, forced-guided contacts from FSD1 and FSD2 relays to form each FSD output. Each FSD output consists of a single normally open contact from one relay; contacts from both relays must be used to ensure proper operation.

One contact from each relay (FSD1 and FSD2) must be used together, as shown in Figure 26(s), to control each individual hazard.

Example (other combinations are possible):
Terminals FSD1a/b interfaced with FSD2a/b
Terminals FSD1c/d interfaced with FSD2c/d
Terminals FSD1e/f interfaced with FSD2e/f

WARNING . . .
Use FSD Outputs in Pairs

One contact from each relay (FSD1 and FSD2) must be used together, as shown in Figure 26(s), to control each individual hazard. Each FSD output consists of a single normally open contact from one relay; **contacts from both FSD relays must be used to ensure proper operation.**

WARNING . . .
Reset Switch Location

Any external System Reset switch(es) must be accessible only from outside, and in full view of, the hazardous area. Reset switches must also be out of reach from within the safeguarded space, and must be protected against unauthorized or inadvertent operation (e.g., through the use of rings or guards). If any areas are not visible from the Reset switches, additional means of safeguarding must be provided as described by the ANSI B11 series of safety requirements or other appropriate standards.

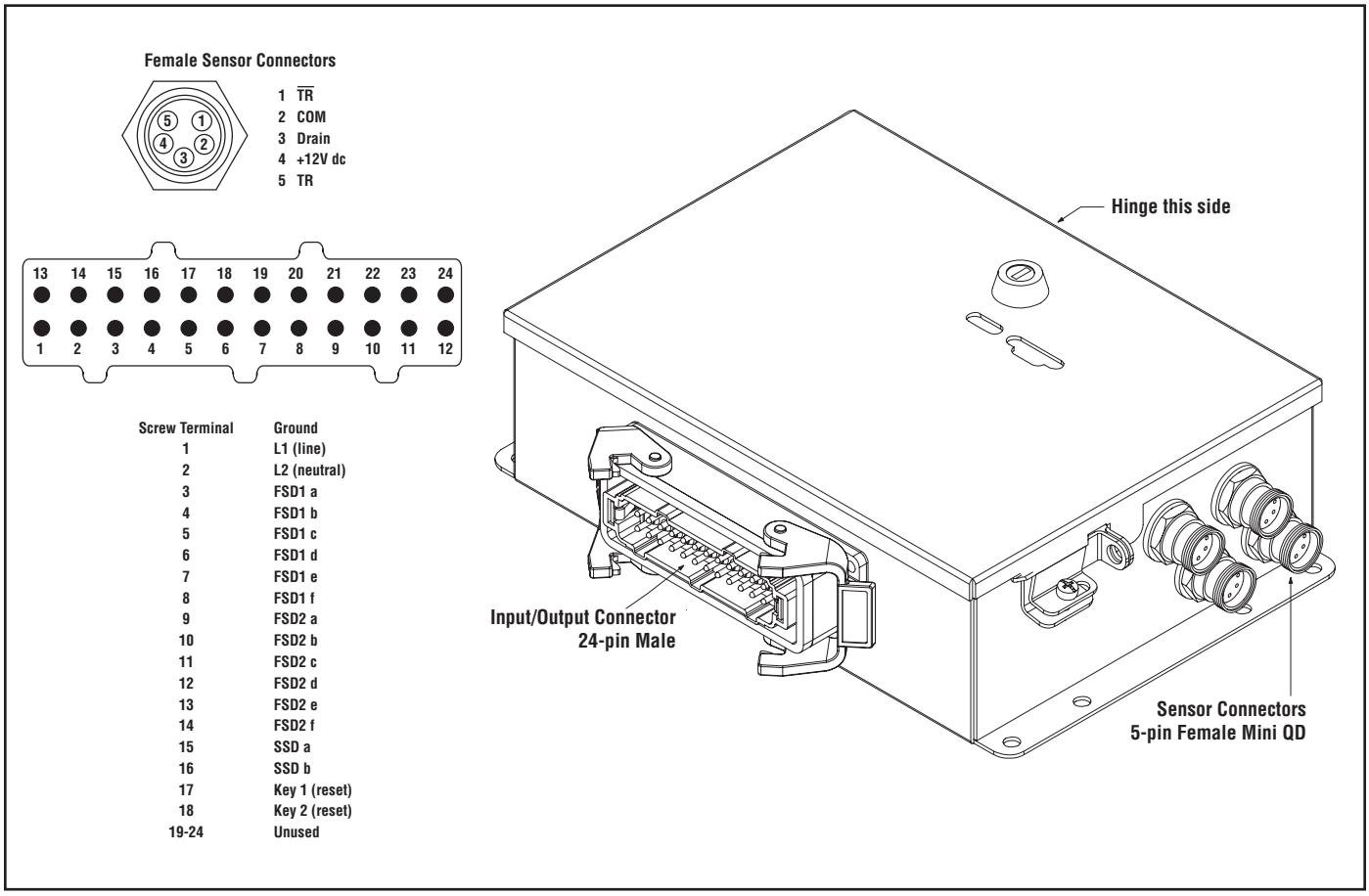
Section 2.10 Addition

2.10(s) External Key Reset

The Key Reset switch that is normally found on the control box front cover has been removed, and has been rewired to the Output Connector (see Figure 21(s) in this document). The user must supply a means to reset the MULTI-SCREEN system if a latch condition occurs (after clearing an interruption of the defined area), or after a lockout condition (see Section 5 of the primary instruction manual).

All reset switches must be located outside the guarded area, where the switch operator has a full and unobstructed view of the entire guarded area and any associated hazards while the reset is performed. The reset switch also must not be reachable from within the guarded area and must be protected (through the use of rings, or guards, for example) against unauthorized or inadvertent operation.

The reset switch must be a normally open switch that is held closed for approximately 0.5 seconds, and then re-opened to accomplish the reset. In the associated primary instruction manual, the “RUN” position is the open condition of the switch; the “RESET” position is closed. The switch must be capable of switching 15 to 50V dc at 20 to 100 mA.



Screw Terminal	Ground
1	L1 (line)
2	L2 (neutral)
3	FSD1 a
4	FSD1 b
5	FSD1 c
6	FSD1 d
7	FSD1 e
8	FSD1 f
9	FSD2 a
10	FSD2 b
11	FSD2 c
12	FSD2 d
13	FSD2 e
14	FSD2 f
15	SSD a
16	SSD b
17	Key 1 (reset)
18	Key 2 (reset)
19-24	Unused

Figure 21 Addition
Figure 21(s). Location and description of QD connectors

Section 3.2.1.1 Addition

3.2.1.1(s) Pass-Through Hazards

A “pass-through hazard” is associated with applications where personnel may pass through a safeguard (at which point the hazard stops or is removed), and then may continue into the hazardous area. Subsequently, their presence is no longer detected, and the safeguard can not prevent the start or restart of the machine. The related danger is the unexpected start or restart of the machine while personnel are within the hazardous area.

In the use of safety light screens, a pass-through hazard typically results from large separation/safety distances calculated from long stopping times, large minimum object sensitivities, reach over, reach through, or other installation considerations. A pass-through hazard can be generated with as little as 75mm (3") between the defined area and the machine frame or hard guarding.

Reducing or Eliminating Pass-Through Hazards
Measures must be taken to eliminate or reduce pass-through hazards. One solution is to ensure that personnel are continually sensed while within the hazardous area. This can be accomplished by using supplemental safeguarding, including: safety mats, area scanners, and horizontally mounted safety light screens. While it is recommended to eliminate the pass-through hazard altogether, this may not be possible due to cell or machine layout, machine capabilities, or other application considerations.

An alternate method is to ensure that once the safeguarding device is tripped it will latch, and require a deliberate manual action to reset. This type of supplemental safeguarding relies upon the location of the Reset switch as well as safe work practices and procedures to prevent an unexpected start or restart of the guarded machine.

The Reset switch or actuating control must be positioned outside the guarded area, and provide the switch operator with a full unobstructed view of the entire guarded area and any associated hazards as the reset is performed. The Reset switch or actuating control must not be reachable from within the guarded area and must be protected (through the use of rings or guards) against unauthorized or inadvertent operation. A key-actuated Reset switch provides some operator control, as the key can be removed by the operator and taken into the guarded area. However, this does not prevent unauthorized or inadvertent resets due to spare keys in the possession of others, or additional personnel entering the safeguarded area unnoticed.

The reset of a safeguard must not initiate hazardous motion. Also, before each reset of the safeguard is performed, safe work procedures require that a start-up procedure be followed and that the individual verifies that the entire hazardous area is clear of all personnel. If any areas can not be observed from the Reset switch location, additional supplemental safeguarding must be used: at minimum, visual and audible warnings of machine start-up.

WARNING . . .
Use of MULTI-SCREEN Systems for Perimeter Guarding

If a MULTI-SCREEN System is installed for perimeter guarding, the system MUST require actuation of a Reset switch before initiating the dangerous machine motion following an interruption of the defined area.

If a MULTI-SCREEN System is used for perimeter guarding, the Machine Primary Control Elements (MPCEs) of the guarded machine must be wired so that **the FSD outputs of the control box cause a latched response of the MPCEs. The MPCEs must be reset only by actuation of a Reset switch.**

The Reset switch must be located outside of, and not be accessible from within, the area of dangerous motion, and it must be positioned so that the area of dangerous motion may be observed by the switch operator during the reset operation.

Additional safeguarding, as described by the ANSI B11 series of safety requirements or other appropriate standards, must be used if any space between either defined area and any danger point is large enough to allow a person to stand undetected by the MULTI-SCREEN System. **Failure to observe this warning could result in serious bodily injury or death.**

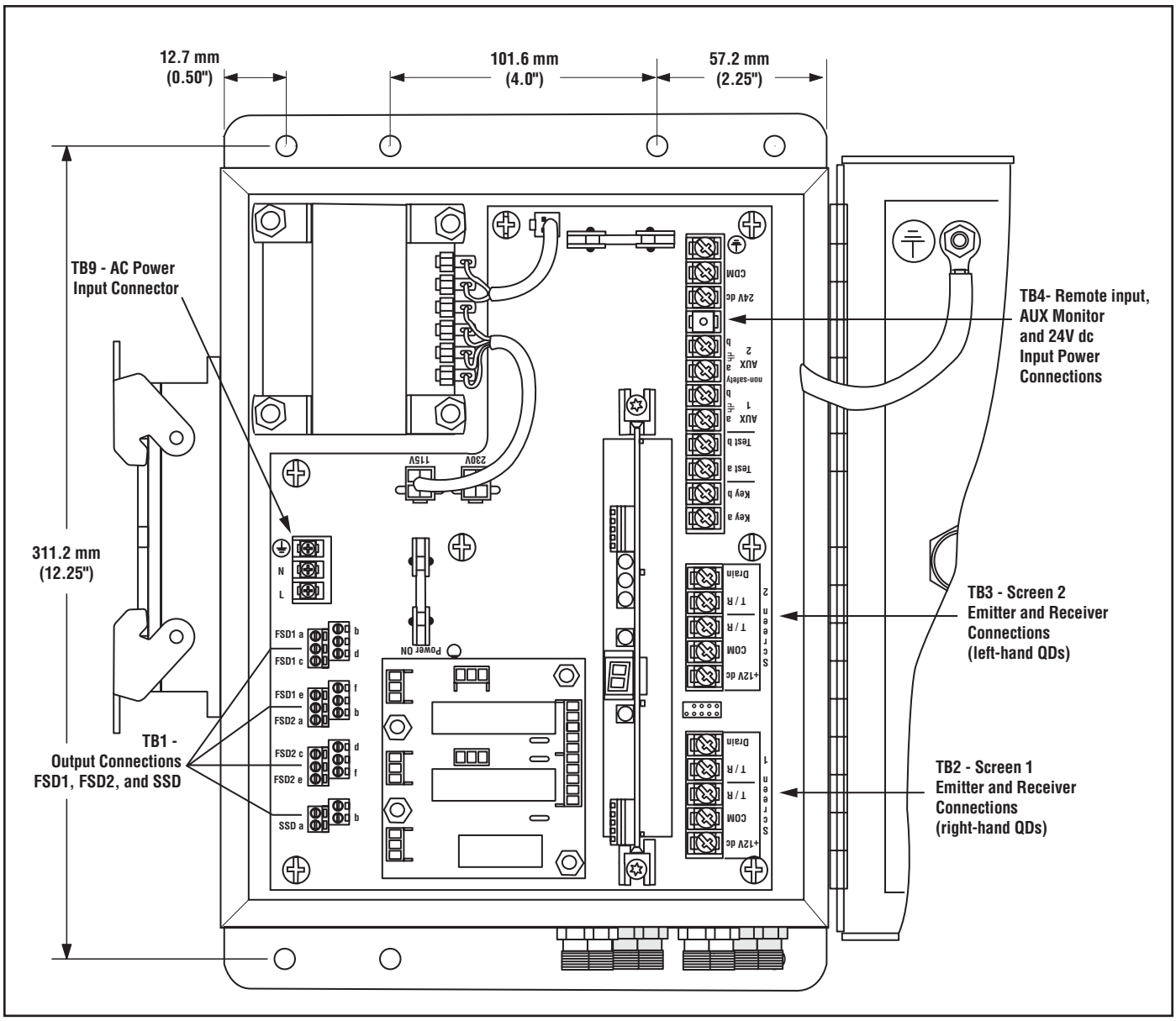


Figure 22 Replacement
Figure 22(s). MULTI-SCREEN System Electrical Connections

Section 3.4 Addition

3.4(s) Controller Module Configuration

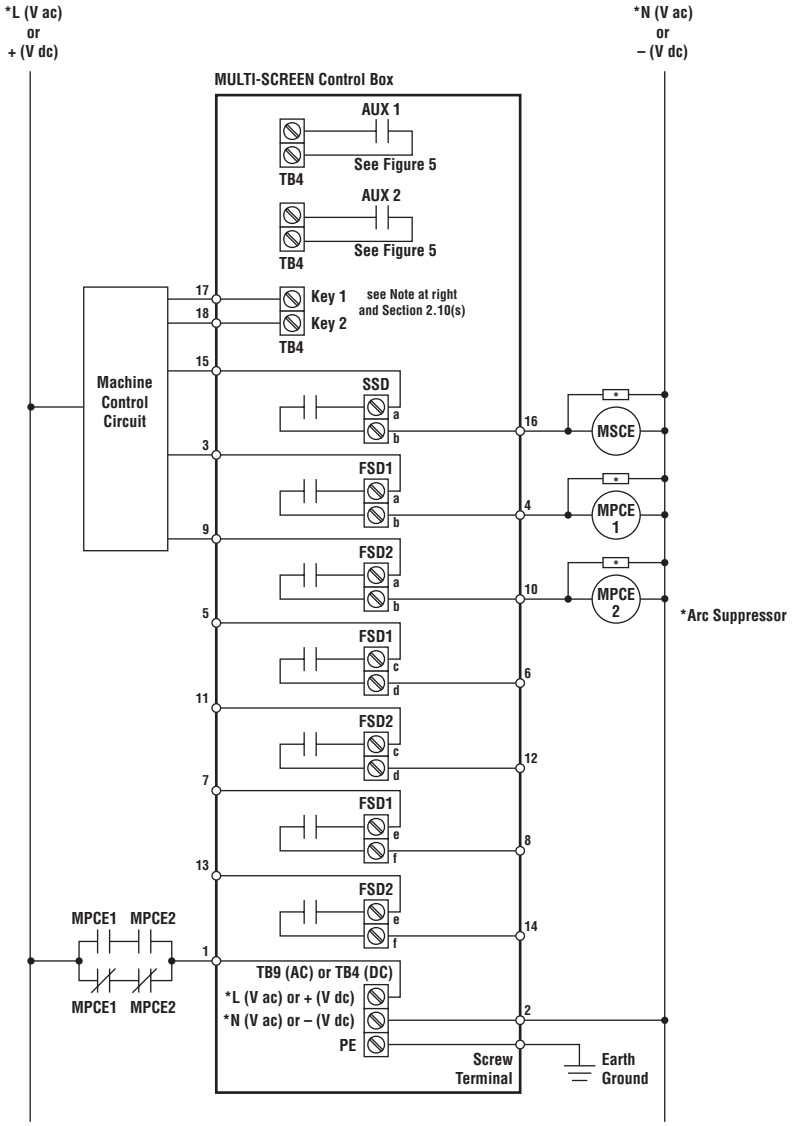
Replace all references in Section 3.4 and Figure 20 of "Auto Power-up" with "TRIP/LATCH Output Select."

Replace the sub-paragraph titled "Auto Power-up Feature ON or OFF" with the following:

Trip/Latch Output Select (Auto/Manual Reset)
Locate the DIP switches to configure the receiver for Trip Output (Auto Reset) or Latch Output (Manual Reset) as described by Figure 20. If Trip Output is selected, the FSD/SSD outputs will turn ON as soon as power is applied, the unit passes an internal self-test/synchronization, and recognizes that all beams are clear. The Trip Output will also automatically reset after all interruptions of one or more beam(s) have been cleared. If Latch Output is selected, the MULTI-SCREEN requires a monitored manual reset at power-up and each time all interruptions of one or more beam(s) have been cleared. The switches must be set identically at both banks A and B.

Regardless of the setting of this switch, a key reset is always necessary to recover from an internal lockout condition.

See Sections 2.2(s), 2.10(s), and 3.2.1.1(s) for Warnings and further information.



CAUTION . . . External Device Monitoring

If the application does not require External Device Monitoring, the EDM input must be jumpered. **It is the user's responsibility to ensure that this does not create a hazardous situation.**

NOTE:
The Key Reset switch has been removed and re-wired to terminals 17 and 18 of the Output connector to provide an external Key Reset.

See Figure 21 for description of 1-24 Output Connector and 1-5 Sensor Connectors (not shown).

WARNING . . . Arc Suppressors

Never install arc suppressors directly across the output contacts of any safeguarding device.

If arc suppressors are used, they must be installed as shown across the coils of the safety relays. It is possible for suppressors to fail as a short circuit.

If installed directly across the contacts of a safety light screen switching device, a short-circuited suppressor will create an unsafe condition that could result in serious injury or death.

WARNING . . . Use FSD Outputs in Pairs

One contact from each relay (FSD1 and FSD2) must be used together to control each individual hazard. Each FSD output consists of a single normally open contact from one relay; contacts from both relays must be used to ensure proper operation.

Figure 26(s) shows hookup for only one hazard to be controlled. For additional MPCEs (i.e., MPCE3/MPCE4, and MPCE5/MPCE6), duplicate hookup as drawn for MPCE1/MPCE2.

Figure 26 Replacement
Figure 26(s). Generic Machine Interface, MULTI-SCREEN System

Replacement Control Box Specifications Category

Output configuration (FSD1, FSD2, and SSD) (Replaces "**Output configuration**" category)	Forced-guided contacts relays, **FSD1 and FSD2:** 250V ac at 4A max (resistive load) **SSD:** 250V ac at 4A max (resistive load) **Mechanical life:** 10,000,000 operations (minimum) **Electrical life:** 100,000 operations (typical @ 1.0kVA switched power, resistive load) Arc suppression is recommended when switching inductive loads. See Warning in Figure 23(s).

Section Replacement
Cables

Two cables required per system, one per sensor

62765	**DEC2-507C**	2.1 m (7') 5-pin Male to Female (20 ga)
62793	**DEC2-515C**	5 m (15') 5-pin Male to Female (20 ga)
62794	**DEC2-525C**	8 m (25') 5-pin Male to Female (20 ga)
62795	**DEC2-550C**	15 m (50') 5-pin Male to Female (20 ga)
62796	**DEC2-575**	23 m (75') 5-pin Male to Female (16 ga)
62797	**DEC2-5100**	30 m (100') 5-pin Male to Female (16 ga)

Other cable lengths available upon request.

Section Addition
Replacement Parts, MULTI-SCREEN Systems

TBD	**MUSAS-1**	Microprocessor control module (for MUSC-1S6-02906)
66547	**MSA-RM-6**	Replacement relay module with six N.O. FSDs
43834	**MUSA-TA-1**	Replacement transformer (for MUSC-1S6)
TBD	**MUSA-PS-6**	Replacement power supply (for MUSC-1S6)

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