



Features

- Offers all of the features of standard MICRO-SCREEN DIN controllers
- Also has an additional pair of FSD (Final Switching Device) contacts to simultaneously control two areas of dangerous motion on the same guarded machine.

MICRO-SCREEN DIN Controllers with four FSD Output Contacts

Model	Part Number	Output Type	Blanking	E-stop Input	Refer to Instruction Manual
USDINT-1T4	55589	Trip	1- or 2-beam floating	Yes	P/N 48753
USDINT-2T4	55591		Fixed and 1- or 2-beam floating		
USDINT-1L4	55597	Latch	1- or 2-beam floating		P/N 54202
USDINT-2L4	55599		Fixed and 1- or 2-beam floating		
USDINT-1T4D	55590	Trip	1- or 2-beam floating		P/N 48753 and DeviceNet Supplement P/N 51699
USDINT-2T4D	55592		Fixed and 1- or 2-beam floating		
USDINT-1L4D	55598	Latch	1- or 2-beam floating		P/N 54202 and DeviceNet Supplement P/N 54205
USDINT-2L4D	55600		Fixed and 1- or 2-beam floating		

Output Relay Operation and Control Reliability

(See also MICRO-SCREEN Instruction Manual Sections 2.7 and 2.8)

The MICRO-SCREEN System controller has three output relays: "FSD1," "FSD2," and "SSD" (see Figure 6).

The contacts of Final Switching Device relays FSD1 and FSD2 connect directly to the Machine Primary Control Elements (MPCEs) of the guarded machine. An MPCE is an electrically powered element of the guarded machine that directly controls the machine's normal operating motion so that it is last (in time) to operate when motion is either initiated or arrested.

As explained in Section 2.8 of the MICRO-SCREEN Instruction Manual, the ability of the safety light screen system to provide a control reliable machine interface depends upon two redundant FSD outputs. It follows that the control circuit of the machine must offer two redundant MPCEs for each area of the machine to be stopped. Each of the two MPCEs must be capable of immediate arrest of dangerous machine motion, irrespective of the state of the other.

MICRO-SCREEN™ DIN Controllers with Four FSD Output Contacts

The System's FSD1 and FSD2 safety relays are continuously self-checked for contact failure by the MICRO-SCREEN System microprocessors (see Section 2.8). The two MPCEs in the machine control circuit must offer forced-guided (positive-guided) monitor contacts which allow the MICRO-SCREEN system to monitor their contact state. See Figure 24 for MPCE monitoring contact hookup information.

Safety relays FSD1 and FSD2 each offer two contacts. This allows one MINI-SCREEN System to interface simultaneously with two machine control circuits. In the depiction of a generalized machine interface (and on the control module), the MPCEs which react to arrest one hazardous motion are labeled MPCE1 and MPCE2, and the MPCEs which arrest the second hazardous motion are labeled MPCE3 and MPCE4 (see Figure 24).

In operation, any object that blocks one or more unblanked beams of the light screen will be detected, causing relays FSD1 and FSD2 (but not SSD) to open their contacts and trigger either a trip or a latch condition (depending on the controller model). See MICRO-SCREEN Instruction Manual Section 2.7 for additional information about FSD response.

All three output relays (FSD1, FSD2, and SSD) open their contacts in response to any one or more lockout conditions, including component failure within the MICRO-SCREEN System itself (see MICRO-SCREEN Instruction Manual Sections 2.3, 2.8, 3.5.2, and 5.1).

The Secondary Control Element (SSD) relay contacts connect to the guarded machine's Machine Secondary Control Element (MSCE). The MSCE is an electrically powered element of the guarded machine (independent of all MPCEs) that is capable of removing power from the prime mover of the dangerous parts of the machine in the event of a system fault or emergency stop.

The Auxiliary/Alarm contact is a separate relay **intended for non-safety-related purposes**. It is typically used to signal a process controller when relays FSD1 and FSD2 open or close.

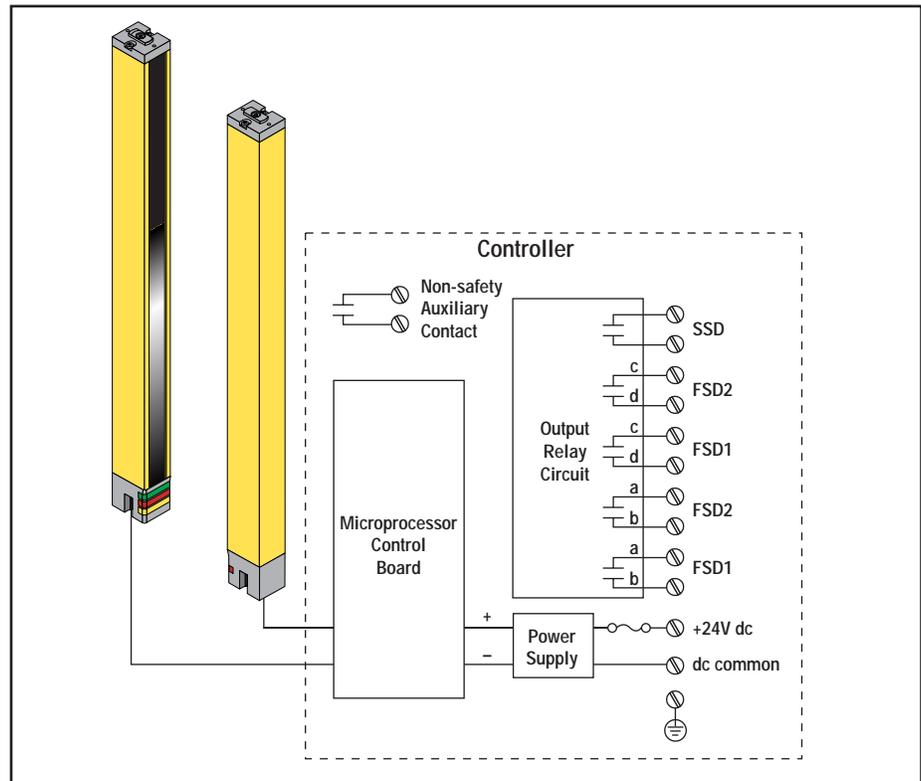


Figure 6*. Banner MICRO-SCREEN System functional schematic – four FSD output contacts

*NOTE: Figure numbers correspond to figures in the MICRO-SCREEN Instruction Manual.

MICRO-SCREEN™ DIN Controllers with Four FSD Output Contacts

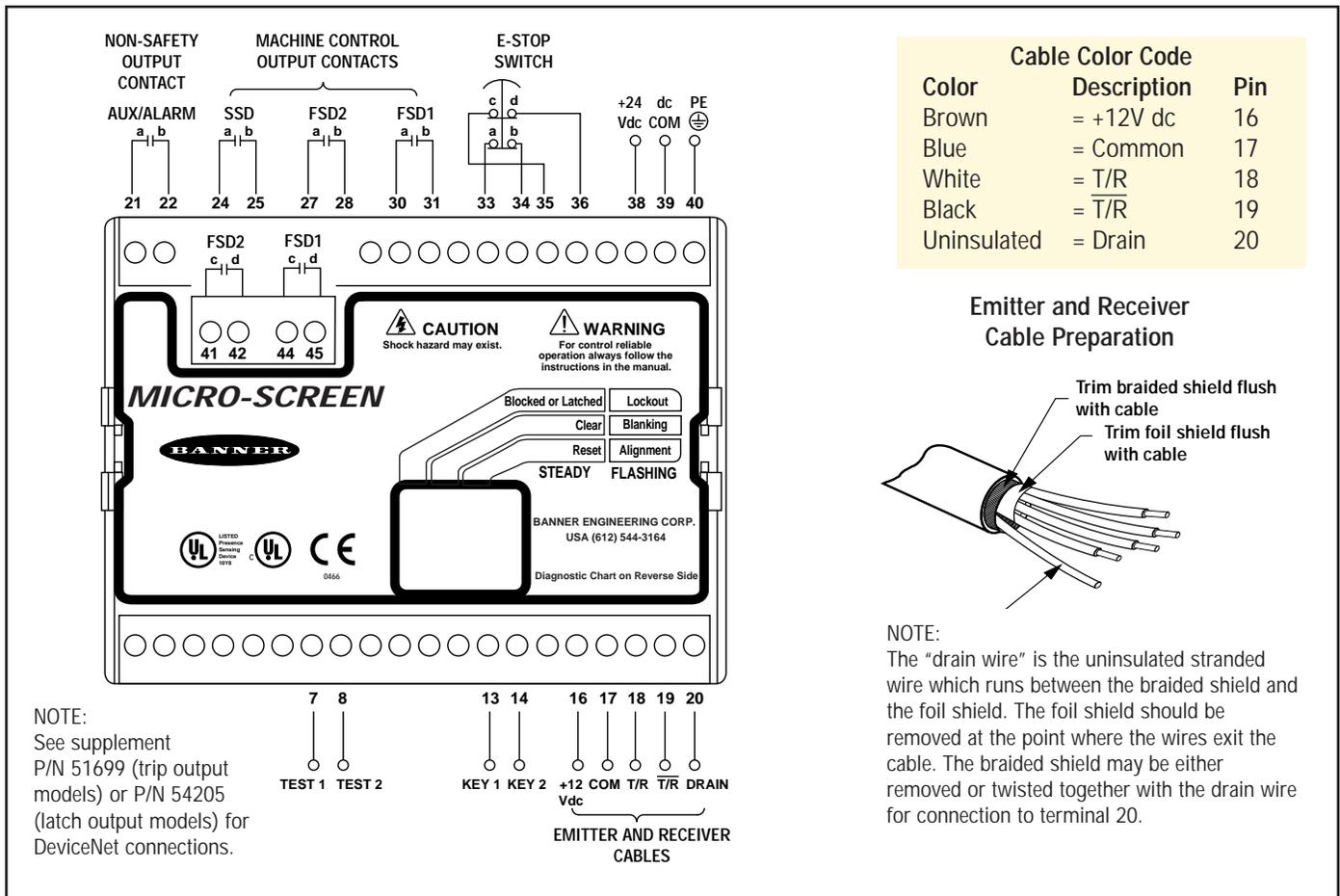


Figure 21. MICRO-SCREEN System electrical connections – four FSD output contacts

Output Relay Connections

(See also MICRO-SCREEN Instruction Manual Section 3.5.6)

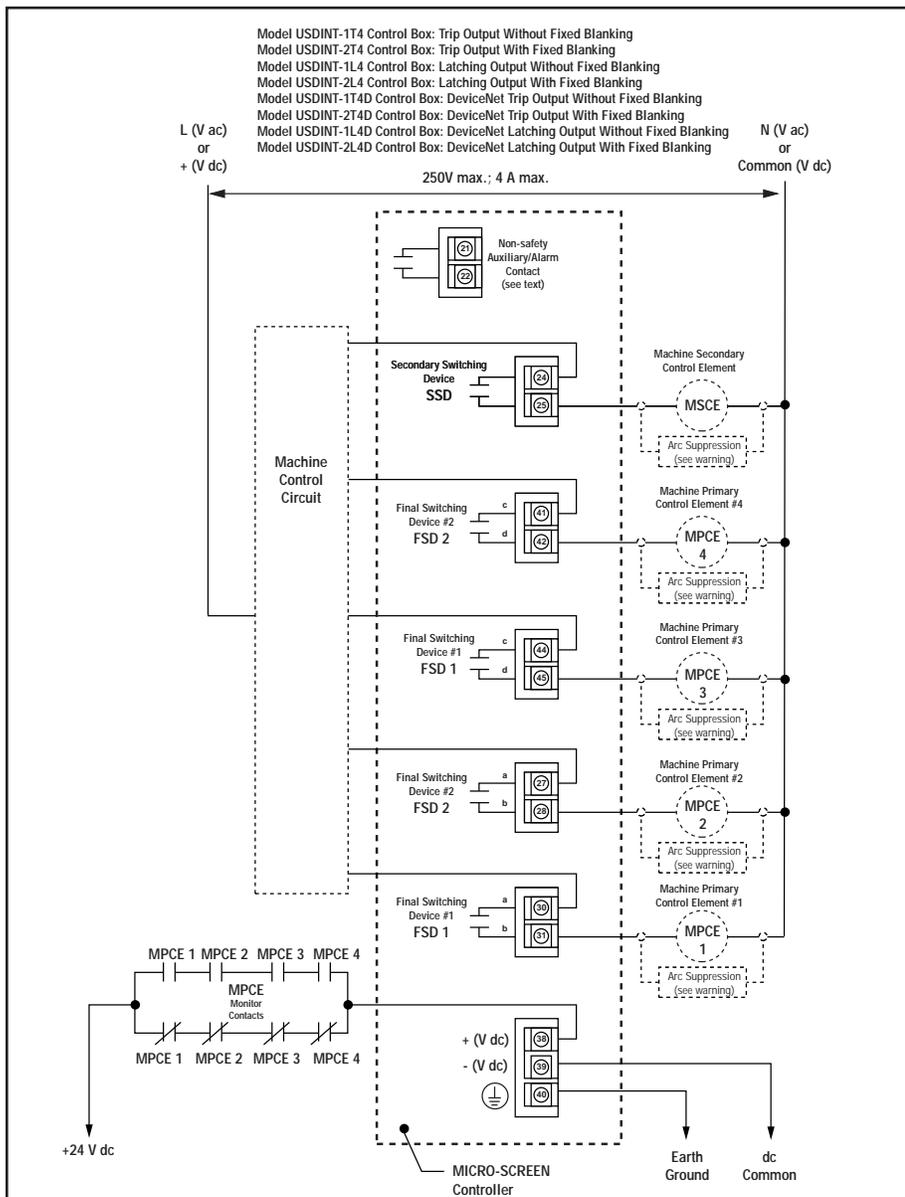
Output relay FSD1 contact a-b connects to MPCE1 (Machine Primary Control Element #1) on the guarded machine. Similarly, output relay FSD2 contact a-b connects to MPCE2; FSD1 contact c-d connects to MPCE3; and FSD2 contact c-d connects to MPCE4.

All four FSD contacts open in response to detection of any object which interrupts one or more unblanked beams of the light screen. MPCE1 and MPCE2 must react to immediately arrest hazardous motion at one machine location. Simultaneously, MPCE3 and MPCE4 must react to arrest hazardous motion at the second machine location. Refer to MICRO-SCREEN Instruction Manual Section 3.5.6 for additional MPCE requirements.

The SSD contact opens (together with all four FSD contacts) in response to any lockout condition, including opening (or engagement) of an E-stop switch (if used). The SSD contact connects to the guarded machine's MSCE (Machine Secondary Control Element), which removes the source of power from the prime mover of the relevant dangerous machine parts. When two areas of dangerous motion are being controlled, the machine control circuit may have two MSCEs; they wire in parallel to each other to be switched together by the SSD contact.

Refer to Section 3 of the MICRO-SCREEN Instruction Manual for information on the non-safety auxiliary/alarm contact and for ratings of all output contacts.

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WARNING . . . Installation of MICRO-SCREEN Systems with Trip Output for Perimeter Guarding Applications

Some control modules described in this supplement produce a “trip” output which automatically resets the output relays as soon as the defined area is clear. Use of a trip output is dangerous for perimeter guarding applications where it is possible for personnel to move through the defined area and locate themselves inside the guarded area of dangerous machine motion.

Banner offers control modules with “latching” output response, which are designed for perimeter guarding applications. **If a control module with trip output response is used for a perimeter guarding application, the following conditions must be met:**

- 1) The dangerous machine motion must be able to be initiated following an interruption of the defined area **only** after actuation of a Reset switch.
- 2) The Machine Primary Control Elements (MPCEs) of the guarded machine must be wired so that the FSD outputs of the control module cause a latched response of the MPCEs.
- 3) The MPCEs must be reset only by actuation of a Reset switch. The Reset switch must be located outside the area of dangerous motion, and must be positioned so that the area of dangerous motion may be observed by the switch operator during the Reset operation.

Failure to observe this warning could result in serious bodily injury or death.



WARNING . . . Arc Suppressor Installation

If arc suppressors are used, they **MUST** be installed as shown across the coils of the machine control elements. **NEVER** install suppressors directly across the contacts of the MICRO-SCREEN switching devices!

It is possible for suppressors to fail as a short circuit. If installed directly across the contacts of a MICRO-SCREEN switching device, a short-circuited suppressor will create an unsafe condition.



WARNING . . . Output Contacts Necessary

All MICRO-SCREEN System output contacts (FSD1, FSD2, and SSD) must be used. The generalized wiring configuration, shown here, is provided only to illustrate the importance of proper installation. The specific wiring of the MICRO-SCREEN System to any particular machine is solely the responsibility of the installer and end user.

Figure 24. MICRO-SCREEN System generic machine interface – four FSD output contacts

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Replacement Parts

Description	Model Number	Part Number
Replacement terminal block, 20 terminals, emitter/receiver hookup (for controllers without DeviceNet)	USA-PTB-1	55676
Replacement terminal block, 15 terminals, emitter/receiver hookup (for controllers with DeviceNet)	USA-PTB-2	55677
Replacement terminal block, 5 terminals, DeviceNet hookup (for controllers with DeviceNet)	USA-PTB-3	55678
Replacement terminal block, 20 terminals, output/E-stop/power hookup	USA-PTB-4	55679
Replacement terminal block, 5 terminals, FSD output hookup	USA-PTB-5	55680
Replacement power supply/relay board	USDA-RM-2	55707
Replacement controller board for controller USDINT-1T4	USDAB-1	50002
Replacement controller board for controller USDINT-2T4	USDAB-2	50003
Replacement controller board for controller USDINT-1T4D	USDAB-1D	52245
Replacement controller board for controller USDINT-2T4D	USDAB-2D	52246
Replacement controller board for controller USDINT-1L4	USDAL-1	55624
Replacement controller board for controller USDINT-2L4	USDAL-2	55626
Replacement controller board for controller USDINT-1L4D	USDAL-1D	55625
Replacement controller board for controller USDINT-2L4D	USDAL-2D	55627

Documentation

The following documentation is supplied with each MICRO-SCREEN System Controller. Additional copies are available at no charge.

Controller Model	Instruction Manual	4-FSD Output Supplement	DeviceNet Supplement	Daily Checkout Card	Semi-annual Checkout Card
USDINT-1T4	48753	55631 (This supplement)	None	48751	48752
USDINT-2T4					
USDINT-1L4	54202		51699		
USDINT-2L4					
USDINT-1T4D	48753		54205		
USDINT-2T4D					
USDINT-1L4D	54202				
USDINT-2L4D					

MICRO-SCREEN™ DIN Controllers with Four FSD Output Contacts



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