

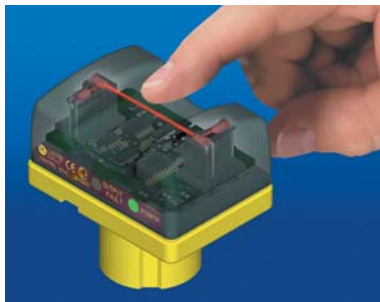


# Two-Hand Control Modules

TWO-HAND  
CONTROL MODULES

## DUO-TOUCH® SG Two-Hand Control Modules . . . page 87

- Monitors STB buttons or other actuators.
- Delivers highest level of safety for two-hand controls.
- Offers choice of operating voltages.



## STB Self-Checking Touch Buttons . . . . . page 94

- Delivers highest level of safety for two-hand controls.
- Self-checks for internal problems.
- Features ergonomic design to prevent repetitive motion stress.



## DUO-TOUCH® Two-Hand Control Modules . . . . . page 97

- Monitors OTB buttons or mechanical push buttons.
- Requires two hands on the controls.
- Responds in milliseconds.



## OTB Optical Touch Buttons . . . . . page 100

- Replaces mechanical push buttons.
- Features ergonomic design to prevent repetitive motion stress.
- Senses light, not pressure.

# TWO-HAND CONTROL MODULES

## Selection Chart

TWO-HAND  
CONTROL MODULES

TWO-HAND CONTROL MODULES

Type	Model	Catalog Page	Type	Supply Voltage	Inputs	Safety Outputs	Output Rating	Auxiliary Outputs	Housing Width
DUO-TOUCH® SG	AT-FM-10K 	Page 87	IIIC	24V ac/dc	2 STB*	<b>2 NO</b>	6 amps	—	22.5 mm
	AT-GM-13A 	Page 87	IIIC	115V ac/ 24V dc	2 STB*	<b>4 NO</b>	6 amps	1 NPN, 1 PNP & 1 NC	45 mm
	AT-HM-13A 	Page 87	IIIC	230V ac/ 24V dc	2 STB*	<b>4 NO</b>	6 amps	1 NPN, 1 PNP & 1 NC	45 mm
	AT-GM-11KM 	Page 87	IIIC	115V ac/ 24V dc	2 STB* & Muting	<b>2 NO</b>	6 amps	1 NPN, 1 PNP & 1 NC	67.5 mm
	AT-HM-11KM 	Page 87	IIIC	230V ac/ 24V dc	2 STB* & Muting	<b>2 NO</b>	6 amps	1 NPN, 1 PNP & 1 NC	67.5 mm
DUO-TOUCH®	AT-AM-2A 	Page 97	IIIA/B	115V ac	2 OTB**	<b>2 NO</b>	4 amps	1 NC	45 mm
	AT-BM-2A 	Page 97	IIIA/B	230V ac	2 OTB**	<b>2 NO</b>	4 amps	1 NC	45 mm
	AT-FM-2A 	Page 97	IIIA/B	24V ac/dc	2 OTB**	<b>2 NO</b>	4 amps	1 NC	45 mm

NC = Normally Closed, NO = Normally Open

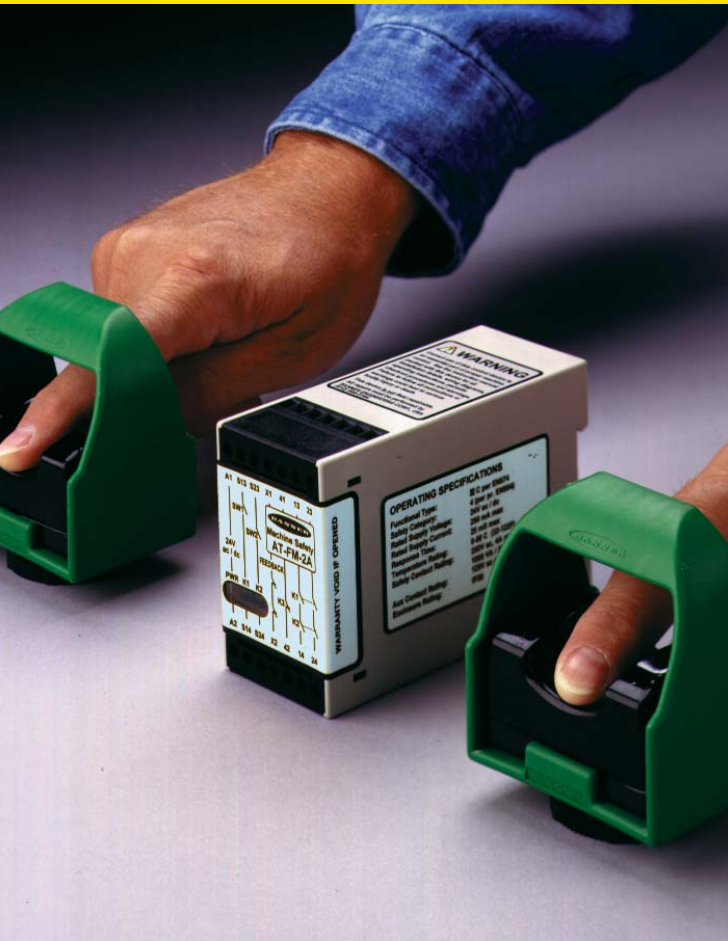
\* May also use two mechanical push buttons, each with one normally open (NO) and one normally closed (NC) contact (Form C). See data sheets for details.

\*\* May also use two mechanical push buttons, each with one normally open (NO) contact. See data sheets for details.

# DUO-TOUCH®

## Two-Hand Control Modules, OTB Compatible

- Monitors a pair of mechanical push buttons or OTB optical touch buttons.
- Permits machine operation only when the operator has both hands on the controls.
- Responds in 25 milliseconds or less.
- Meets Type IIIA/B requirements for Safety Category 1 and 3.
- Monitors the status of machine control elements.



TWO-HAND CONTROL MODULES

DUO-TOUCH® SG MODULES

STB BUTTONS

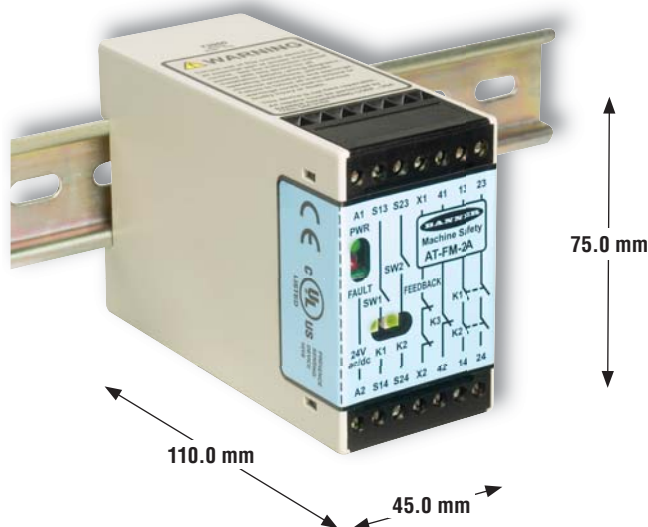
DUO-TOUCH® MODULES

OTB BUTTONS



### DUO-TOUCH® Two-Hand Control Modules, OTB Compatible

- 24V ac/dc, 115V ac, or 230V ac
- Three green and one red LED indicators
- NEMA 1 polycarbonate housing
- Standard 35 mm DIN rail track mounting



AT-..M-2A Models  
(AT-FM-2A Module shown)

## TWO-HAND CONTROL MODULES

### DUO-TOUCH® Modules

## DUO-TOUCH® Two-Hand Control Modules, OTB Compatible






Models	Supply Voltage	Inputs	Safety Outputs	Output Rating	Auxiliary Outputs	Terminals	Timing Diagrams	Data Sheet
AT-AM-2A	115V ac	2 OTB*	2 NO	4 amps	1 NC	Fixed	TD003 (p. 239)	47550
AT-BM-2A	230V ac							
AT-FM-2A	24V ac/dc							

NC = Normally Closed, NO = Normally Open

\* May also use two mechanical push buttons, each with one normally open (NO) contact. See data sheet for details.

NOTE: Kits are available which include one DUO-TOUCH Safety Module and two OTB Touch Buttons. OTB Touch Buttons are also available separately. See page 100.


## DUO-TOUCH® Kits – e/m Relay OTB Touch Buttons

Kit	Kit Components				
	DUO-TOUCH Safety Module	Supply Voltage	Safety Outputs	OTB Touch Buttons	
				Model	Cable*
Includes 2 OTB Touch Buttons & a DUO-TOUCH Safety Module					
AT-AM-K5	 AT-AM-2A	115V ac	2 NO	OTBA5	2 m
AT-AM-K5Q				OTBA5QD	5-Pin Mini QD
AT-BM-K5	 AT-BM-2A	230V ac	2 NO	OTBB5	2 m
AT-BM-K5Q				OTBB5QD	5-Pin Mini QD
AT-FM-K81	 AT-FM-2A	24V ac/dc	2 NO	OTBVR81	2 m
AT-FM-K81Q				OTBVR81QD	5-Pin Mini QD

NC = Normally Closed, NO = Normally Open

\* For 9 m cable, add suffix W/30 to the 2 m model number (example, AT-AM-K5 W/30). A model with a QD requires a mating cable. QD cables are ordered separately (see page 178).

## DUO-TOUCH® Kits – Solid-State OTB Touch Buttons

Kit	Kit Components				
	DUO-TOUCH Safety Module	Supply Voltage	Safety Outputs	OTB Touch Buttons	
				Model	Cable*
Includes 2 OTB Touch Buttons & a DUO-TOUCH Safety Module					
AT-FM-K6	 AT-FM-2A	24V ac/dc	2 NO	OTBVN6 & OTBVP6	2 m
AT-FM-K6Q				OTBVN6 & OTBVP6	4-Pin Mini QD

NC = Normally Closed, NO = Normally Open

\* For 9 m cable, add suffix W/30 to the 2 m model number (example, AT-FM-K6 W/30). A model with a QD requires a mating cable. QD cables are ordered separately (see page 178).

## DUO-TOUCH® Safety Modules Specifications

<b>Supply Voltage and Current</b>	<b>Model AT-AM-2A:</b> 115V ac ±15% at 100 mA <b>Model AT-BM-2A:</b> 230V ac ±15% at 50 mA <b>Model AT-FM-2A:</b> 24V ac/dc ±15% at 250 mA	
<b>Supply Protection Circuitry</b>	Protected against transient voltages and reverse polarity (dc hookup is without regard to polarity)	
<b>Safety Outputs</b>	<b>Outputs (K1 and K2):</b> Two redundant (total of four) safety relay (forced-guided) contacts <b>Contact ratings:</b> <b>Max. voltage:</b> 250V ac or 250V dc <b>Max. current:</b> 4A ac or dc (resistive load) <b>Max. power:</b> 1000 VA, 200 watts <b>Mechanical life:</b> 10,000,000 operations <b>Electrical life:</b> 100,000 cycles (typically @ 1.0 kVA switching power)  <b>NOTE: Transient suppression is recommended when switching inductive loads. Install suppressors across load. Never install suppressors across output contacts.</b>  <b>Auxiliary Monitor Output (K3):</b> One non-safety relay contact <b>Maximum switching voltage:</b> 125V ac or dc <b>Maximum switching current:</b> 500 mA (resistive load)	
<b>Output Response Time</b>	25 milliseconds maximum	
<b>Input Requirements</b>	Outputs from actuating devices must each be capable of switching 40 to 100 mA @ 12 to 18V dc.	
<b>Simultaneity Monitoring Period</b>	300 milliseconds (typical) < 500 milliseconds under single-fault conditions	
<b>Status Indicators</b>	<b>3 green LED indicators:</b> Power ON K1 energized K2 energized	<b>1 red LED indicator:</b> Fault
<b>Housing</b>	Polycarbonate. Rated NEMA 1; IEC IP20	
<b>Mounting</b>	Mounts to standard 35 mm DIN rail track. Safety Module must be installed inside an enclosure rated NEMA 3 (IEC IP54), or better.	
<b>Vibration Resistance</b>	10 to 55Hz @ 0.35 mm displacement per IEC 68-2-6	
<b>Operating Conditions</b>	<b>Temperature:</b> 0° to +50° C <b>Relative humidity:</b> 90% @ +50° C (non-condensing)	
<b>Safety Category</b>	1 and 3 per ISO 13849-1; Type IIIA/B per ISO 13851 (EN574) (Dependent on hookup and installation of the hand controls)	
<b>Certifications</b>	For a list of certifications see page 236.	
<b>Wiring Diagrams</b>	<b>AT-..M-2A models:</b> WD035 (p. 266) <b>AT-..M-2A to OTB Buttons:</b> WD037 (p. 267)	



# OTB

## Optical Touch Buttons

- Responds to a finger blocking light rather than to pressure.
- Features ergonomic design to prevent repetitive motion stress.
- Includes field cover to prevent unintended switching.
- Available with e/m relay rated for 7 amp switching capacity.
- Withstand exposure to a variety of chemicals, depending on model.



### OTB Optical Touch Buttons

- 10 to 30V dc, 20 to 30V ac/dc, 105 to 130V ac, or 210-250V ac
- One red LED indicator
- Polysulfone or polycarbonate upper housing
- 2 m or 9 m integral cable or quick-disconnect fitting
- Housing sealed to IEC IP66
- Optional field cover colors



OTB models

OTB models with cover

## OTB Specifications

Supply Voltage and Current	<p><b>OTBVR81 models:</b> 20 to 30V ac/dc  <b>OTBA5 models:</b> 105 to 130V ac, 50-60 Hz  <b>OTBB5 models:</b> 210 to 250V ac, 50-60 Hz  <b>OTBVN6/VP6 models:</b> 10 to 30V dc  All models require less than 25 mA (exclusive of load)</p>
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	<p><b>OTBVR81, OTBA5, and OTBB5 models:</b> SPDT electromechanical relay  <b>OTBVN6 models:</b> Complementary (SPDT) NPN (sinking) open-collector transistor; 1 normally open (NO) and 1 normally closed (NC)  <b>OTBVP6 models:</b> Complementary (SPDT) PNP (sourcing) open-collector transistors; 1 normally open (NO) and 1 normally closed (NC)</p>
Output Rating	<p><b>Models with electromechanical relay:</b>  <b>Max. switching current:</b> 7 amps (resistive load), 1 HP maximum  <b>Min. load:</b> 0.05 watts (dc), 0.05 VA (ac)  <b>Mechanical life of relay:</b> 50,000,000 operations (minimum)  <b>Electrical life of relay:</b> 100,000 operations (min.) at full resistive load  Transient suppression is recommended when switching inductive loads.</p> <p><b>Models with solid-state outputs:</b>  150 mA maximum load (each output)  <b>On-state saturation voltage:</b> less than 1 volt at signal levels; less than 1.5 volts at full load  <b>Off-state leakage current:</b> less than 1 microamp</p>
Response Time	100 milliseconds
Output Protection	All models protected against false pulse on power-up. Models with solid-state outputs have overload and short circuit protection.
Indicators	<b>Two red indicator LEDs:</b> One lights whenever power is applied; the other lights whenever the switch is activated making the normally-open (NO) output conduct.
Construction	Totally encapsulated, non-metallic enclosure. Black polysulfone or red polycarbonate upper housing (see Application Notes below); fiber-reinforced thermoplastic polyester base. Electronics fully epoxy-encapsulated. Supplied with a field cover of polypropylene (TP).
Environmental Rating	Meets NEMA standards 1, 3, 4, 4X, 12 and 13; IEC IP66
Connections	PVC-jacketed 2 m or 9 m cables, or Mini-style quick-disconnect (QD) fitting are available. QD cables are ordered separately. See page 178.
Ambient Light Immunity	120,000 lux (direct sunlight)
EMI/RFI Immunity	Immune to both single and mixed EMI and RFI noise sources
Operating Conditions	<b>Temperature:</b> -20° to +50° C <b>Relative humidity:</b> 90% at 50° C (non-condensing)
Application Notes	<p><b>OTB Optical Touch Buttons by themselves are not stand alone devices.</b> They must be installed to prevent accidental actuation (example, use of field covers). The environment in which they are installed must not adversely affect the means of actuation (example, severe contamination). See DUO-TOUCH module manuals for information on two-hand control safety applications.</p> <p><b>Environmental considerations for models with polysulfone upper housings:</b>  The polysulfone upper housing will become embrittled with prolonged exposure to outdoor sunlight. Window glass effectively filters longer wavelength ultraviolet light and provides excellent protection from sunlight.</p> <p><b>Environmental considerations for models with polycarbonate upper housings:</b>  Avoid prolonged exposure to hot water and moist high-temperature environments above 66° C. Avoid contact with aromatic hydrocarbons (such as xylene and toluene), halogenated hydrocarbons and strong alkalis. Clean periodically using mild soap solution and a soft cloth. Avoid strong alkaline materials.</p>
Certifications	For a list of certifications see page 236.
Wiring Diagrams	<b>Solid State NPN/PNP:</b> WD036 (p. 266)