

SWITCH-RATED Plugs & Receptacles

THE MAIN DIFFERENCES



DECONTACTOR™ Technology

Pressing the pawl/button on the receptacle will safely switch off power to the load. The plug can then be withdrawn in complete safety. (Cutaway model shown for illustration purposes)

Like most MELTRIC products, Switch-Rated plugs and receptacles feature (see pgs 6-8)

- ▶ Spring-loaded butt contacts
- ▶ Silver-nickel contact materials
- ▶ Dead front design
- ▶ Enclosed arc chambers
- ▶ Spring-assisted terminals
- ▶ Auxiliary contacts

MELTRIC Switch-Rated plugs and receptacles have additional features, including:

- ▶ UL & CSA switch-ratings
- ▶ Horsepower ratings
- ▶ Short circuit ratings up to 100 kA in fuse protected circuits

Switch and Hp Ratings

MELTRIC Switch-Rated products are a combination plug, receptacle and disconnect switch in the same device. Their integral switch technology ensures the safe breaking of resistive and inductive loads (up to 75 hp or 200A) before an operator can physically remove the plug from the receptacle.

They are UL and CSA approved for both “branch circuit” and “motor circuit” disconnect switching, making them ideal for connecting motors, welding machines and virtually any other electrical equipment.

Short Circuit Ratings

MELTRIC Switch-Rated plugs and receptacles help ensure worker safety even in fault conditions. They are rated to close into and withstand short circuit currents of 65 kA to 100 kA. The protection far surpasses that offered by other plugs and receptacles, and even surpasses the short circuit protection offered by most manual motor controllers and mechanical interlocks.



To match the functionality of a Switch-Rated device, it would take a pin and sleeve plug plus a non-fused safety switch.

UL & CSA Standards

Test requirements and ratings comparison table

To achieve their UL 2682 switch ratings, MELTRIC Switch-Rated plugs and receptacles have passed tests that far exceed those of ordinary plugs and receptacles. These tests include horsepower/locked rotor overload tests from the UL 508 Standard for Industrial Control Equipment and electrical endurance and short-circuit make-and-withstand testing from the UL 98 standard for Enclosed and Dead Front Switches.

To illustrate how the electrical and mechanical endurance of MELTRIC Switch-Rated plugs and receptacles far exceeds standard plugs, the following chart compares the test requirements for achieving a Switch-Rated plug & receptacle listing with those required for a standard pin and sleeve plug & receptacle listing.

Test	UL 1682 & CSA 22.2 No. 182.1		UL Subject 2682 (used for both UL & CSA listings)
	Plugs, Receptacles & Cable Connectors of the Pin & Sleeve Type		Switch-Rated Plugs & Receptacles
	Non-Current Interrupting Break (minimum requirements)	Current Interrupting (minimum requirements)	Motor Circuit/Branch Circuit Disconnect Switching (Tests passed by MELTRIC devices)
Temperature Rise	< 30°C	< 30°C	< 30°C
Voltage Withstand	3,000VAC for 1 Minute	3,000VAC for 1 Minute	3,000VAC for 1 Minute
Overload General Use Devices	3 Operations @ 150% Rated Current (p.f. = .75 - .80)	50 Operations @ 150% Rated Current (p.f. = .75 - .80)	50 Operations @ 150% Rated Current (p.f. = .75 - .80)
Mechanical Endurance (Plus Req'd Electrical Opns)	15-20A = 5000 Operations 21-63A = 2000 Operations 64-250A = 250 Operations	15-20A = 0 Operations 21-63A = 1000 Operations 64-250A = 500 Operations	4000 Cycles
Electrical Endurance (with load)	-	15-20A = 5000 Operations 21-63A = 1000 Operations ¹ 64-250A = 250 Operations ¹ @ Rated Current & Voltage (p.f. = .75 - .80)	6000 Operations @ Rated Current & Voltage (p.f. = .75 - .80)
Overload - Locked Rotor (Horsepower Rated Devices)	-	50 Operations @ 600% of Full Load Motor Current (p.f. = .40 - .50)	50 Operations @ 600% of Full Load Motor Current (p.f. = .40 - .50)
Short Circuit Withstand	-	≥ 10 kA ⁺ (600V and ≤ .50 power factor)	≥ 10 kA ⁺ (600V and ≤ .50 power factor)
Short Circuit Closing	-	-	≥ 10 kA ⁺ (600V and ≤ .50 power factor)

¹ Testing alternates between mechanical & electrical operations. This reduces the severity of the electrical test by allowing additional cooling time during electrical testing.
⁺ All MELTRIC Switch-Rated devices are UL listed with short circuit ratings of at least 65kA achieved at 600VAC and ≤ .15 power factor.



BENEFIT FROM USING MELTRIC SWITCH-RATED DEVICES...

Ensure Worker Safety

Switch-Rated plugs and receptacles ensure safety by eliminating hazards associated with pin & sleeve and twist-type devices.

- ▶ The integral switching function ensures that the plug contacts are deenergized before an operator can remove the plug from the receptacle. The dead front design prevents unintended access to live parts.
- ▶ Spring-loaded, silver-nickel butt style contacts maintain proper contact force, withstand arcing, resist wear, and maintain low contact resistance. This ensures the integrity of the connection over thousands of operations and eliminates performance and safety problems common to plugs with brass contacts.
- ▶ Spring-loaded plug and receptacle disengagement with push button operation ensures fast and easy load breaking, which minimizes arcing during disconnection. Enclosed arc chambers eliminate the possibility of external arcs that could be a safety hazard for the operator.
- ▶ Horsepower, switch and short circuit ratings provide additional protection during locked-rotor or other significant overload situations.



Simplify Code Compliance

Switch-Rated devices provide a simple and cost effective means of helping facilities to achieve compliance with the National Electric Code and NFPA 70E.

NEC Compliance

Articles 430.101 to 430.113 of the National Electrical Code regulate the means of motor disconnection (Canadian Electrical Code section 28-600-28-604). They require motors to have readily accessible, 'line of sight' disconnects that are an approved switch or a properly rated plug and receptacle.

- ▶ **430.102** A disconnecting means must be located in sight of the motor and driven equipment.
- ▶ **430.107** The disconnecting means must be readily accessible.
- ▶ **430.109** The disconnecting means must be an approved switch or horsepower rated plug & receptacle.

MELTRIC Switch-Rated plugs and receptacles are both horsepower and switch-rated. Thus, they can function as a 'line of sight' disconnect in addition to providing a convenient plug and play power connection for the motor. By installing a Switch-Rated device, the need for an auxiliary disconnect switch is eliminated.

NFPA 70E (CSA Z462)

This OSHA consensus standard covers electrical safety related work practices and procedures for employees who work on or near exposed energized electrical conductors or other live circuit parts. Relevant requirements include:

Power must be proven to be off before work can be performed. This requires:

- ▶ The safe interruption of the load & opening of the disconnect
- ▶ Visual verification/voltage testing to ensure deenergization

The potential electrical hazard must be identified and documented.

- ▶ An arc flash risk assessment must be performed
- ▶ Flash protection boundaries must be determined

Appropriate steps must be taken to protect persons working near live parts or within the flash protection boundary.

- ▶ PPE must be worn based on incident energy exposure levels (cal/cm²)
- ▶ Only properly qualified persons are allowed to perform work

...THROUGHOUT YOUR FACILITY

Wiring and connection systems utilizing conventional switches and/or pin & sleeve devices would typically require all of the previously listed protective measures to comply with NFPA 70E or CSA Z462. By using MELTRIC Switch-Rated plugs and receptacles to connect equipment, users can very simply comply with these requirements.

Switch ratings ensure the safe interruption of the load. Visual verification that the power is off is provided when the plug is removed from the receptacle. A dead front design prevents an operator from being exposed to live parts, eliminating the need to perform hazard analysis, establish flash protection boundaries and use electrical personal protective equipment.

A Comparison of the Motor Change-Out Process

MOTOR HARD-WIRED TO A BLADED DISCONNECT SWITCH	MOTOR CONNECTED WITH A MELTRIC MOTOR PLUG	MOTOR CONNECTED WITH A COMPETING PLUG & RECEPTACLE
<p>The disconnect switch may be difficult to install in "line of sight" of the motor.</p> <p>18"</p> <p>Qualified Worker w/PPE</p>	<p>OR</p> <ul style="list-style-type: none"> ▶ Cord connection allows easy "line of sight" location ▶ Dead front eliminates access to live parts and need for cumbersome PPE ▶ Ability to safely make & break under load eliminates the need for interlocks ▶ $\geq 65\text{kA}$ short circuit make-and-withstand rating ensures safety during reenergization <p>OR</p>	<ul style="list-style-type: none"> ▶ Expensive mechanical interlocks are required since these plugs & receptacles cannot safely make & break under load ▶ The interlock must be mounted on a fixed surface this may make "line of sight" location more difficult
MOTOR CHANGE-OUT PROCESS	MOTOR CHANGE-OUT PROCESS	MOTOR CHANGE-OUT PROCESS
<ol style="list-style-type: none"> 1. Switch disconnect to OFF position 2. Apply lockout/tagout 3. Perform Shock/Arc Flash Risk Assessment 4. Obtain permit for energized electrical work 5. Suit up with appropriate PPE 6. Remove the disconnect switch cover 7. Voltage test to verify deenergization 8. Disconnect motor from hard-wiring 9. Remove old/install new motor 10. Connect new motor to hard-wiring 11. Jog the motor to ensure proper rotation 	<ol style="list-style-type: none"> 1. Depress the pawl on the receptacle to break the circuit. 2. Mechanic removes plug from receptacle 3. Apply lockout/tagout as required 4. Mechanic removes old /installs new motor 5. Mechanic inserts plug into receptacle <p>MELTRIC Makes it Safe & Easy</p>	<ol style="list-style-type: none"> 1. Open interlock switch 2. Determine PPE requirements and obtain permit for electrical work 3. Remove interlock cover 4. Verify deenergization with a voltmeter test 5. Remove plug 6. Apply lockout/tagout as required 7. Remove old/install new motor 8. Insert plug into receptacle

Reduce Equipment & Installation Costs

The ability of MELTRIC Switch-Rated devices to safely make and break under full load eliminates the need for the expensive interlocks that are required with pin and sleeve devices. Their ability to function as the NEC required 'line of sight' disconnect switch eliminates the need for auxiliary disconnect switches. Optional pilot contacts can eliminate the need of auxiliary connectors in control circuits.

Reduce Equipment Change-out Downtime & Cost

Using MELTRIC Switch-Rated plugs and receptacles to connect motors and other equipment instead of hard-wiring can help reduce equipment change-out time by as much as 50%. With new motors pre-wired with MELTRIC plugs or inlets, the only electrical connection required during the change-out will be to plug in the new motor. Thus, a mechanic will be able to perform the change-out without the immediate aid of an electrician. This avoids the inconvenience of scheduling an electrician for a service call. So, extra downtime required to do the wiring is eliminated. The pre-wiring of replacement motors with MELTRIC plugs or inlets can be done off-site and during the convenience of non-downtime periods. This makes MELTRIC plugs and receptacles an ideal choice for 'plug and play' and modular process applications.

SELECTING THE RIGHT MELTRIC SWITCH-RATED PLUG & RECEPTACLE

All SWITCH-RATED devices (DSN, DS and DB) feature DECONTACTOR™ Technology:



- ▶ UL & CSA switch-ratings
- ▶ Short circuit closing and withstand protection (65kA to 100kA)



- ▶ Silver-nickel contact material
- ▶ Spring-loaded, butt-style contacts



- ▶ Dead front safety shutter
- ▶ Optional auxiliary contacts



DSN Series (pages 24-37)

Choose DSN Series for its...

- ▶ Compact, lightweight design
- ▶ Automatic Type 4X/IP69k watertightness
- ▶ High HP Ratings (up to 75 hp)

Common Applications

- ▶ Wet or washdown environments
- ▶ Plug & play electrical connections



DS Series (pages 38-55)

Choose DS Series for its...

- ▶ High amperage range (up to 200A)
- ▶ Poly or metal casing materials (60A and above)
- ▶ Larger conductor capacities

Common Applications

- ▶ Heavy industry
- ▶ High amperage equipment



DB Series (pages 56-69)

Choose DB Series for its...

- ▶ Robust, heavy duty construction

Common Applications

- ▶ Motors with frequent make and break requirements
- ▶ Harsh environments

DSN Models and Ratings

Model	Casing Material	Maximum Voltage (VAC)	Amperage Rating	Maximum Number of Contacts		Environmental Rating	Maximum Horsepower Rating	
				Main	Auxiliary		480 VAC	600 VAC
DSN20	Poly	600 VAC	20A	3P+N+G	2 pilots	Type 4X/IP69k	5 hp	5 hp
DSN30	Poly	600 VAC	30A	3P+N+G	2	Type 4X/IP69k	10 hp	15 hp
DSN60	Poly	600 VAC	60A	3P+N+G	4	Type 4X/IP69k	20 hp	20 hp
DSN150	Poly or Metal	600 VC	150A	3P+N+G	6	Type 4X/IP69k	75 hp	75 hp

DS Models and Ratings

Model	Casing Material	Maximum Voltage (VAC)	Amperage Rating	Maximum Number of Contacts		Environmental Rating	Maximum Horsepower Rating	
				Main	Auxiliary		480 VAC	600 VAC
DS20	Poly	600 VAC	20A	3P+N+G	2	Type 3R	7.5 hp	10 hp
DS30	Poly	600 VAC	30A	3P+N+G	4	Type 3R	15 hp	15 hp
DS60	Poly	600 VAC	60A	3P+N+G	4	Type 3R	25 hp	25 hp
DS100C	Poly or Metal	600 VAC	100A	3P+N+G	4	Type 3R	50 hp	50 hp
DS100	Poly or Metal	600 VAC	100A	3P+N+G	6	Type 3R	30 hp	-
DS200	Metal	480 VAC	200A	3P+N+G	4	Type 3R	-	-

DB Models and Ratings

Model	Casing Material	Maximum Voltage (VAC)	Amperage Rating	Maximum Number of Contacts		Environmental Rating	Maximum Horsepower Rating	
				Main	Auxiliary		480 VAC	600 VAC
DB30	Zinc Aluminum	600 VAC	30A	3P+N+G	2	IP67	20 hp	25 hp
DB60	Zinc Aluminum	600 VAC	60A	3P+N+G	2	IP67	30 hp	30 hp
DB100	Zinc Aluminum	600 VAC	100A	3P+N+G	4	IP67	60 hp	60 hp

SWITCH-RATED

Plugs & Receptacles



MELTRIC's Switch-Rated product line featuring DECONTACTOR™ technology, includes devices rated from 20 amps to 200 amps. An integral switch mechanism enables workers to safely connect and disconnect motors, welding machines and other industrial equipment.



DSN P. 24

COMPACT AND IP69K WATERTIGHTNESS

- 20A to 150A (75 hp)
- Automatic Type 4X/IP69K watertightness



DS P. 38

LARGER WIRING CAPACITY AND METAL CASINGS

- 20A to 200A, Type 3R (4X optional)
- Poly or metal casings (60A and above)
- Larger conductor capacities



DB P. 56

ROBUST CONSTRUCTION

- 30A to 100A
- Heavy duty construction, high impact resistance