

Cl-tronic[™]

Product overview and selection guide

CI-tronic[™] stands for high performance and long life

There are many ways to control a heating process or a motor, but you'll have a hard time finding a better way than with Danfoss CI-tronicTM components.

The CI-tronic concept represents a breakthrough in contactor technology. In effect, we've revolutionized the solid state relay to create a range of electronic contactors and motor controllers that are as simple to use as they are advanced. On the one hand, CI-tronic contactors are as easy to specify and install as ordinary electro-mechanical components. On the other, they provide the switching speed of a solid state relay, yet thanks to their unique design outlast conventional SSRs by a factor of 10.

The secret? At the heart of every CI-tronic component is a new power chip that eliminates the thermal problems which cause early burnouts in traditional SSRs. We call the technology "LTE," for low thermal expansion, but bottom

line for you is significantly greater reliability and operational life.

Danfoss CI-tronic contactors are ideal for just about any type of industrial heating application, while CI-tronic motor controllers can be used on everything from conveyors to cranes.

Just as important, like all Danfoss controls, CI-tronic components come with our usual assurance of global availability, fair prices, volume supply and fast delivery. And, of course, responsive service, if needed.

<u>able of contents</u>

Introduction	2
Electronic contactors	4
Electronic contactors ECI-1	6
Electronic contactors ECI-2	8
Electronic contactors ECI-3	10
Analogue power controllers ACI	12
Motor controllers	14
Motor controllers MCI	16
Motor controllers with Brake MCI B	18
Starting torque limiters TCI	20
Motor contactors MCI DOL	22
Reversing contactors RCI	24
Common information	26



A new standard across a whole product range

CI-tronic components set high standards for quality and reliability, but you'll also be impressed by the sheer scope of the product range. It includes both electronic contactors and analog power controllers as well as soft starters, torque limiters, reversing contactors and other types of motor controllers. Moreover, CI-tronic contactors already comply with IEC/EN 60947-4-3, the coming EU standard that will put tight new controls on ambient and operating temperatures and EMC immunity and emission.

Electronic contactors

ECI	Electronic contactors
ACI	Analogue power controller

Motor controllers

MCI	Motor controllers (soft starters)
MCI	MCI B soft starter with Brake
тсі	Starting torque limiters
MCI DOL	Motor contactors
RCI	Reversing contactors

LTE technology takes the heat off our power chip

In conventional power relays, excessive heat generated by the power chip can lead to metal fatigue due to the different thermal expansion rates between the chip, the heat conductor and the current clip. In addition, air pockets in the soldering create hot spots on the chip, which can also impair performance and cause breakdowns. LTE technology solves the problem in a unique way to give you a high quality product with extremely long life:

- New materials virtually eliminate the effects of thermal expansion in the power chip
- New design with fewer soldering points increases heat dissipation
- New one-shot vacuum soldering process prevents the formation of air pockets and hot spots

The CI-tronics power chip consists of a silicon device soldered in a sandwich construction between a current clip and a heat conductor assembly. The chip allows current to flow when a control voltage is applied to the gate.





And they're as easy to specify and install as ordinary contactors

Contactors and motor controllers play a relatively small if crucial role in most processes, so why should choosing the right component be so complicated. You'll find CI-tronic components refreshingly easy to work with — as simple to specify and install as standard electro-mechanical devices and vastly easier to deal with than conventional SSRs. It only takes a moment to configure them, and there's no need for heat sinks or varistors. CI-tronic components can be dimensioned to their full rated power and are delivered as a completely engineered product featuring:

- Compact modular construction
- DIN-rail mountable design
- Industry standard ratings
- Universal control voltages
- LED status indicators
- Logical control settings



Electronic contactors

CI-tronic[™] means fewer burnouts, better process control, longer heater life

It can happen to any OEM. You deliver a large and expensive system to a customer far from home. One day there's a breakdown and an urgent call for help. A service rep is dispatched to solve the problem only to find a burned out contactor in the heater system — a small fault but one that ends up costing you time, money, maybe even a little goodwill.

Whether you're producing equipment for injection molding, die casting, shrink wrapping or baking, constant operation eventually takes its toll on your heat control switch. Naturally, you can help avoid the unexpected by choosing contactors that are reliable. But you can also make contactor replacement an even rarer occurrence by equipping your system with CI-tronicTM components.

CI-tronic contactors are purpose-built for demanding industrial applications — or applications where you just don't want to risk that unexpected call in the night. With LTE technology, burnouts due to thermal stress become a very remote concern. CI-tronic contactors outlast solid state relays by a factor of 10 and outperform electro-mechanical contactors by an even wider margin. And they're price competitive, too.

CI-tronic products also gives you better control of your heating process and longer heater life. Control is improved by the use of faster switching patterns which provide more stable process temperatures, which in turn reduces thermal stress and extends heater life.

CI-tronic contactors outlast solid state relays by a factor of 10



- << Accurate control of baking temperatures with CI-tronic components helps ensure a quality product.
- < Robust design makes CI-tronic contactors a wise choice for welding applications.



Soldering of sensitive electronic components requires the precise control provided by CI-tronic technology.

<

The dependability and long life of our components makes them ideal for heating applications in the plastics industry.



Electromechanical contactors

The low switching rates of electromechanical contactors cause wide temperature swings, resulting in poor process control and reduced heater life.

Electronic contactors

CI-tronic contactors permit fast switching frequencies, giving you far better control of the heating process, fewer temperature fluctuations and reduced stress on the heater.



Voltage



CI-tronic[™] also simplifies purchasing and logistics

- Use CI-tronic components for a wide range of applications including electric heaters, infrared lamps, frequent switching valves, soft starting of transformers, welding machines and other equipment. They switch single and three-phase heaters up to 50 Amps.
- Use CI-tronic products worldwide. They're designed for line voltages up to 600 V a.c., feature a universal control voltage, and automatically adjust to 50/60 Hz operation.

Single-phase electronic contactors Type ECI-1



election guide				Operational voltage		
Operational current max. AC-1	Control voltage	Dimensions	Туре	24-230 V a.c. Code no.	24-480 V a.c. Code no.	24-600 V a.c. Code no.
15 A	5-24 V d.c.	22.5 mm module	ECI 15-1	037N0063	037N0065	037N0067
15 A	24-230 V a.c./d.c.	22.5 mm module	ECI 15-1	037N0064	037N0066	037N0068
30 A	5-24 V d.c.	45 mm module	ECI 30-1	037N0007	037N0009	037N0011
30 A	24-230 V a.c./d.c.	45 mm module	ECI 30-1	037N0001	037N0003	037N0005
50 A	5-24 V d.c.	90 mm module	ECI 50-1	037N0008	037N0010	037N0012
50 A	24-230 V a.c./d.c.	90 mm module	ECI 50-1	037N0002	037N0004	037N0006

Wiring diagram



Wiring diagram Motor load



Functional diagram



Operating at high temperatures

If the contactor is placed inside small cabinets, care must be taken to avoid exceeding the max. ambient temperature. Otherwise the current must be derated according to table.

Ambient Temperature	ECI 15	ECI 30	ECI 50
40°C	15 A	30.0 A	50.0 A
50°C	12.5 A	25.0 A	40.0 A
60°C	10 A	20.0 A	30.0 A

For further information on dimensions, mounting and temperature overload protection see common information, page 26.

Dual-phase electronic contactors Type ECI-2



Sele	ection guide				(Operational voltage	2
Op ma	perational current ax. AC-1 ¹	Control voltage	Dimensions	Туре	24-230 V a.c. Code no.	24-480 V a.c. Code no.	24-600 V a.c. Code no.
30	A	5-24 V d.c.	45 mm module	ECI 30-2	037N0019	037N0021	037N0023
30	A	24-230 V a.c./d.c.	45 mm module	ECI 30-2	037N0013	037N0015	037N0017
50	A	5-24 V d.c.	90 mm module	ECI 50-2	037N0020	037N0022	037N0024
50	А	24-230 V a.c./d.c.	90 mm module	ECI 50-2	037N0014	037N0016	037N0018
¹⁾ r	¹⁾ rated as the maximum sum of current in L1 and L2						

Wiring diagram

2 Single-phase loads



Wiring diagram Three-phase load



Functional diagram



Operating at high temperatures

If the contactor is placed inside small cabinets, care must be taken to avoid exceeding the max. ambient temperature. Otherwise the current must be derated according to table.

Ambient Temperature	ECI 30	ECI 50
40°C	30.0 A	50.0 A
50°C	25.0 A	40.0 A
60°C	20.0 A	30.0 A

For further information on dimensions, mounting and temperature overload protection see common information, page 26.

Three-phase electronic contactors Type ECI-3



Selection guide				Operational voltage		
Operational current max. AC-1	Control voltage	Dimensions	Туре	24-230 V a.c. Code no.	24-480 V a.c. Code no.	24-600 V a.c. Code no.
10 A	5-24 V d.c.	45 mm module	ECI 10-3	037N0031	037N0033	037N0035
10 A	24-230 V a.c./d.c.	45 mm module	ECI 10-3	037N0025	037N0027	037N0029
20 A	5-24 V d.c.	90 mm module	ECI 20-3	037N0032	037N0034	037N0036
20 A	24-230 V a.c./d.c.	90 mm module	ECI 20-3	037N0026	037N0028	037N0030

Wiring diagram



Wiring diagram

Motor load



Functional diagram



Operating at high temperatures

If the contactor is placed inside small cabinets, care must be taken to avoid exceeding the max. ambient temperature. Otherwise the current must be derated according to table.

Ambient Temperature	ECI 10	ECI 20
40°C	10.0 A	20.0 A
50°C	8.0 A	16.0 A
60°C	6.5 A	13.0 A

For further information on dimensions, mounting and temperature overload protection see common information, page 26.

Analogue power controllers Type ACI



Selection guide		Operational voltage			
Operational current max. AC-1	Supply voltage	Dimensions	Туре	24-230 V a.c. Code no.	24-480 V a.c. Code no.
30 A	19-28 V a.c./d.c.	45 mm module	ACI 30-1	037N0057	037N0059
50 A	19-28 V a.c./d.c.	90 mm module	ACI 50-1	037N0058	037N0060

Control methods & function



Phase angle mode principle Automatic load adaptation





Wiring diagram



Ambient temperature	ACI 30	ACI 50
40°C	30.0 A	50.0 A
50°C	25.0 A	40.0 A
60°C	20.0 A	30.0 A

Operating at high temperatures

If the controller is placed inside small cabinets, care must be taken to avoid exceeding the max. ambient temperature. Otherwise the current must be derated according to table.

For further information on dimensions, mounting and temperature overload protection see common information, page 26.

13



Motor controllers



Cl-tronic motor controllers can be adjusted precisely for the needs of your application. Ramp-up and ramp-down times can be set from 0.5 -10 seconds. Starting torque can be adjusted from 0-85% of nominal torque. And for applications with high breakaway torque the controller can provide a kickstart of full torque for 200 ms.

CI-tronic[™] also represents an affordable breakthrough in motor controls

Soft starters are a tested way to keep torque surges in AC motors from damaging the equipment they're meant to control — nothing new about that. What is new, however, is that now there's an affordable line of these controls designed specifically for smaller motors — the CI-tronic range from Danfoss.

CI-tronic motor controllers cover the power range from 0.1 to 11 kW. They're ideal for applications that require smooth starting and stopping but that don't call for the expense of a conventional soft starter. Use them on pumps, fans, conveyors, gear or belt-driven machinery and countless other types of equipment. They provide precise control while reducing the shocks and vibrations that are a major cause of equipment failure and downtime. In addition, by reducing inrush currents during motor startup they eliminate power dropouts that can damage sensitive electronic equipment, saving you the expense of having to reinforce the line.

There are also a variety of CI-tronic controllers for more specialized tasks. For example, our motor contactors and reversing contactors are ideal for applications with frequent starts and stops. A zero cross-switching technique is used (the contactor always switches when the voltage is zero) to ensure speed and accuracy. These reliable products provide long service on everything from automatic doors to thread cutting machines and are an effective way to control difficult functions like "inching" on cranes.

Finally, for less demanding applications it's hard to beat our starting torque limiters, which offer the dependability of CI-tronic technology at highly attractive prices.













Everyone benefits

Regardless of the application, CI-tronic motor controllers provide smooth and precise starting and stopping while reducing wear and tear on your equipment. But they also benefit individual applications in specific ways.

Conveyors and packaging equipment

- Smooth operation prevents tilting and spills
- Less stress on belts/chains prevents snapping/breakage
- Long life on indexing and reversing
- Unlimited start/stop

Automatic doors

- Smooth opening and closing
- Faster operation

Cranes

- No rough stops when clutch brake is engaged
- No gearbox damage due to operator inching

Fans

- No belt squirreling or snapping
- Reduced number of belts

Pumps

- No water hammering
- No damaged piping due to pressure peaks

Compressors

• Reduced starting current eliminates line voltage drop

Tooling machines

- Long life on indexing
- Fast reversing

Motor controllers Type MCI



16

Features

- Individual adjustable acceleration and deceleration times, 0.5-10 seconds
- Initial torque adjustable from 0-85%
- Breakaway function (Kick Start)
- Universal control voltage: 24-480 V a.c./d.c.

- Automatic detection of missing phases
- Automatic adaptation to 50/60 Hz
- LED status indicator
- Built-in varistor protection
- Unlimited start/stop operations per hour
- Optional Aux. contacts
- IP 20 protection
- Compact DIN rail mountable design

0.0

		TAXABLE INC.		A STATISTICS
General		Sec.		100 mm
Туре	MCI 15		MCI 25	
Product description	The digital controlled MCI sof The MCI controller has indivi and the unique breakaway (kic	t starter are designed for s dually adjustable accelerat k start) function the contr	smooth control of 3 phase AC m ion and deceleration times. Than oller can be optimized for almos	otors. iks to the adjustable initial torque t any application
Typical applications	AC motor application where a inertia loads. MCI controllers a	smooth start and/or stop are also obvious as replace	is advantageous, such as conveyo ement of star/delta starters	ors, fans, pumps, compressors and high
Design standard	IEC/EN 60947-4-2			
Approvals	CE, CSA and NRTL/C			
Output specifications				
Operational current AC 3, AC 53a and AC 58a (motor load)	15 A		25 A	
Motor size at: 208-230 V a.c. 400-480 V a.c. 550-600 V a.c.	0.1-4.0 kW (0.18-5 HP) 0.1-7.5 kW (0.18-10 HP) 0.1-7.5 kW (0.18-10 HP)		0.1-7.5 kW (0.18-10 0.1-11 kW (0.18-15 0.1-18kW (0.18-25 F	HP) HP) -P)
Leakage current	5 mA a.c. max.			
Minimum operational current	50 mA			
Overload current profile	X-1x: 8-3			
Overload relay trip class	Class 10			
Semiconductor protection fusing type 1 co-ordination type 2 co-ordination	50 A gL/gG 1800 A²S		80 A gL/gG 6300 A²S	
Thermal specifications and environment				
Power dissipation, continuous duty	2 W/A			
Power dissipation, intermittent duty	$2 \text{ W/A} \times \text{duty cycle}$			
Ambient temperature range	-5 to 40 °C			
Cooling method	Natural convection			
Mounting	Vertical (see also general mou	nting instructions)		
Max. ambient temperature				
with limited current	60°C, see derating for high ter	nperatures in chart below		
Storage temperature range	-20 to 80°C			
Protection degree/pollution degree	IP 20/3			
Insulation specifications				
Rated insulation voltage, U _i	660 V			
Rated impulse withstand				
voltage, U _{imp}	4 kV			
Installation category				
Control specifications				
Control voltage (+/- 10%)	24-480 V a.c./d.c.			
Drop-out voltage	5 V a.c./d.c.			
Control current/power max.	15 mA/2 VA			
Response time max.	70 ms			
Ramp-up time	Adjustable 0-10 seconds			
Ramp-down time	Adjustable 0-10 seconds, 0-20	0 seconds on version with	aux. contact	
Initial torque	Adjustable 0-85% of nominal	torque, with or without "l	kick start"	
SCR auxialiary contacts (optinal)				
Voltage/current max.	24-480 V a.c./0.5 A (AC-14, A	AC-15)		
Fuse max.	Moots requirements of EN 500	182 1 and EN 50082 2		
	Meets requirements of EIV 500			
_				

Selection guide

Operational voltage	Motor current max.	Motor power max.	Control voltage	Dimensions	Туре	Aux. contacts	Code no.
208-230 V a.c.	15 A	4.0 kW/5.5 HP	24-480 V a.c./d.c.	45 mm module	MCI 15	-	037N0037
	25 A	7.5 kW/10 HP	24-480 V a.c./d.c.	90 mm module	MCI 25	-	037N0038
	25 A	7.5 kW/10 HP	24-480 V a.c./d.c.	90 mm module	MCI 25	I-0, By-pass	037N0069*
400-480 V a.c.	15 A	7.5 kW/10 HP	24-480 V a.c./d.c.	45 mm module	MCI 15	-	037N0039
	25 A	11 kW/15 HP	24-480 V a.c./d.c.	90 mm module	MCI 25	-	037N0040
	25 A	11 kW/15 HP	24-480 V a.c./d.c.	90 mm module	MCI 25	I-0, By-pass	037N0070*
550-600 V a.c.	15 A	7.5 kW/10 HP	24-480 V a.c./d.c.	45 mm module	MCI 15	-	037N0041
	25 A	18.5 kW/25 HP	24-480 V a.c./d.c.	90 mm module	MCI 25	-	037N0042
	25 A	18.5 kW/25 HP	24-480 V a.c./d.c.	90 mm module	MCI 25	I-0, By-pass	037N0071*

* Available as of January 2000

Wiring and functional diagrams



Line voltage (L1, L2, L3) Control voltage Motor voltage T1, T2, T3 LED 1 ____ LED 2 ____ Aux. Contacts: 23-24 by-pass 13-14 I-0



Soft start with initial torque and soft stop.

Example 2: Soft start with kick start, initial torque and soft stop.

Note: Auxiliary contacts 13-14 and 23-24 is only abailable on some MCI 25 types

Adjustments

Control of the motor is achieved by acting on the motor voltage. The motor speed will depend on the actual load on the motor shaft. A motor with little or no load will reach full speed before the voltage has reached its maximum value.The motor controller will "read" time and torque settings in off state.



Operating at high temperatures

If the motor controller is placed inside small cabinets, care must be taken to avoid exceeding the max. ambient temperature. Otherwise the current must be derated according to table.

For further information on dimensions, mounting and temperature overload protection see common information, page 26.

Motor overload and short circuit protection

Overload and short circuit protection of the motor is easily achieved by installing a circuit breaker on the supply side of the motor controller.

Select the circuit breaker from the selection table according to the rated nominal operational current of the motor.

For information on prospective short circuit current please refer to data for circuit breaker.

Motor full	Danfoss CTI 25
load current	circuit breaker
А	Code no.
0 1 0 16	047B3020
0.1-0.10	047D3020
0.16-0.25	047B3021
0.25-0.4	047B3022
0.4-0.63	047B3023
0.63-1.0	047B3024
1.0-1.63	047B3025
1.6-2.5	047B3026
2.5-4.0	047B3027
4-6.3	047B3028
6-10	047B3029
10-16	047B3030
16-20	047B3031
20-25	047B3032

MCI 25

Ambient MCI 15 temperature

comportataro		
40°C	15 A	25.0 A
50°C	12.5 A	17.5 A
60°C	10.0 A	15.0 A

Motor controllers with Brake, Type MCI 25B



Selection guide

Operational voltage	Motor current max.	Motor power max.	Control voltage	Dimensions	Туре	Code no.
208-230 V a.c.	25 A	7,5 kW/10 HP	24-480 V a.c./d.c.	90 mm module	MCI 25 B	037N0061
400-480 V a.c.	25 A	11 kW/15 HP	24-480 V a.c./d.c.	90 mm module	MCI 25 B	037N0062

Wiring and functional diagrams





Adjustments



Operating at high temperatures

If the motor controller is placed inside small cabinets, care must be taken to avoid exceeding the max. ambient temperature. Otherwise the current must be derated according to table.

For further information on dimensions, mounting and temperature overload protection see common information, page 26.

Motor overload and short circuit protection

Overload and short circuit protection of the motor is easily achieved by installing a circuit breaker on the supply side of the motor controller.

Select the circuit breaker from the selection table according to the rated nominal operational current of the motor.

For information on prospective short circuit current please refer to data for circuit breaker.

Motor full load current A	Danfoss CTI 25 circuit breaker Code no.
1.6-2.5	047B3026
2.5-4.0	047B3027
4-6.3	047B3028
6-10	047B3029
10-16	047B3030
16-20	047B3031
20-25	047B3032

Ambient MCI 25 temperature

40 °C	25.0 A
50 °C	17.5 A
60 °C	15.0 A

Starting torque limiters Type TCI



Features

• Adjustable ramp-up time, from 0.5-5 seconds

• Single and three-phase operation

• LED status indicator

- Initial torque adjustable from 0-85%
- Built-in varistor protection
- Unlimited start/stop operations per hour
- IP 20 protection
- Compact DIN-rail mountable design

			Ale
General	State of the second		
Туре	TCI 15	TCI 25	
			2 Same
Product description	TCI starting torque limiters are designed for soft starting of 1 ar install between the motor starter and the motor, and features ad	nd 3-phase AC motors. The TCI unit is easy justable ramp-up time and initial torque.	y to
Typical applications	AC motor application where a soft start is required, such as con	veyors, fans, compressors and high inertia lo	oads.
Design standard	IEC/EN 60947-4-2		
Approvals	CE, CSA and NRTL/C		
Output specifications			
Operational current			
AC 3, AC 53a and AC 58a	17 A		
(motor load)	15 A	25 A	
Motor size at: 208-240 V a c	0.1 - 4.0 kW (0.18-5 HP)	0.1 - 7.5 kW (0.18-10 HP)	
400-480 V a.c.	0.1-7.5 kW (0.18-3 HI)	0.1 - 11 kW (0.18 - 10 Hr)	
550-600 V a.c.	0.1 - 7.5 kW (0.18-10 HP)	0.1 - 18kW (0.18-25 HP)	
Minimum operational current	50 mA		
Overload current profile	X-Tx: 8-3		
Overload relay trip class	Class 10		
Semiconductor protection fusing			
type 1 co-ordination	50 A gL/gG	80 A gL/gG	
type 2 co-ordination	1800 A'S	6300 A ² S	
Thermal specifications and environment			
Power dissipation			
continuous duty	1 W/A		
Power dissipation, intermittent duty	1 W/A. × duty cycle		
Ambient temperature range	0 to 45 °C		
Cooling method	Natural convection		
Mounting	Vertical (see also general mounting instructions)		
Max. ambient temperature			
with limited current	60°C, see derating for high temperatures in chart below		
Storage temperature range	-20 to 80°C		
Protection degree/pollution degree	IP 20/3		
Insulation specifications			
Rated insulation voltage, U _i	660 V		
Rated impulse withstand			
voltage, U _{imp}	4 kV		
Installation category	III		
Control specifications			
Ramp-up time	Adjustable from 0.5-5 seconds		
Initial torque	Adjustable from 0-85% of nominal torque		
EMC immunity	Meets requirements of EN 50082-1 and EN 50082-2		

Selection guide

Operational voltage	Motor current max.	Motor power max.	Dimensions	Туре	Code no.
208-230 V a.c.	15 A	4.0 kW/5.5 HP	45 mm module	TCI 15	037N0045
	25 A	7.5 kW/10 HP	45 mm module	TCI 25	037N0046
400-480 V a.c.	15 A	7.5 kW/10 HP	45 mm module	TCI 15	037N0045
	25 A	11 kW/15 HP	45 mm module	TCI 25	037N0046
480-600 V a.c.	15 A	7.5 kW/10 HP	45 mm module	TCI 15	037N0047
	25 A	18.5 kW/25 HP	45 mm module	TCI 25	037N0048
690 V a.c.	25 A	18.5 kW/25 HP	45 mm module	TCI 25	037N0049

Wiring and functional diagrams





Adjustments

Control of the motor is achieved by acting on the motor voltage. The motor speed will depend on the actual load on the motor shaft. A motor with little or no load will reach full speed before the voltage has reached its maximum value.



Operating at high temperatures

If the motor controller is placed inside small cabinets, care must be taken to avoid exceeding the max. ambient temperature. Otherwise the current must be derated according to table.

For further information on dimensions, mounting and temperature overload protection see common information, page 26.

Motor overload and short circuit protection

Overload and short circuit protection of the motor is easily achieved by installing a circuit breaker on the supply side of the motor controller.

Select the circuit breaker from the selection table according to the rated nominal operational current of the motor.

For information on prospective short circuit current please refer to data for circuit breaker.

Motor full load current A	Danfoss CTI 25 circuit breaker Code no.
0.1-0.16	047B3020
0.16-0.25	047B3021
0.25-0.4	047B3022
0.4-0.63	047B3023
0.63-1.0	047B3024
1.0-1.63	047B3025
1.6-2.5	047B3026
2.5-4.0	047B3027
4-6.3	047B3028
6-10	047B3029
10-16	047B3030
16-20	047B3031
20-25	047B3032

TCI 25

Ambient TCI 15 temperature

1		
40 °C	15 A	25 A
50 °C	15 A	25 A
60 °C	15 A	20 A

Motor contactors Type MCI-DOL



Features

- Direct on-line starting
- Long life: AC-3: 25 mill. cycles AC-4: 5 mill. cycles
- Universal control voltage
- LED status indicator

- Built-in varistor protection
- Unlimited start/stop operations per hour
- IP 20 protection
- Compact DIN-rail mountable design

General	
Туре	MCI 15 DOL
Product description	MCI-DOL electronic motor contactors are designed for fast and demanding switching of 3-phase AC motors. The contactors are burst fired for reduced EMC emission, have LED status indicators and accept universal control voltages
Typical applications	Cranes, packaging machines and other applications with frequent inching, jogging or plugging and where a high number of operating cycles is essential.
Design standard	IEC/EN 60947-4-2
Approvals	CE, CSA and NRTL/C
Output specifications	
Operational current AC 3 (motor load) AC 4 (motor load, inching, jogging)	15 A
Motor size at: 24-230 VAC 24-480 VAC 24-600 VAC	0.1-4.0 kW (0.18-5 HP) 0.1-7.5 kW (0.18-10 HP) 0.1-7.5 kW (0.18-10 HP)
Leakage current	5 mA a.c. max.
Minimum operational current	50 mA
Overload current profile	X-Tx: 8-3
Overload relay trip class	Class 10
Semiconductor protection fusing type 1 co-ordination type 2 co-ordination	50 A gL/gG 1800 A²S
Thermal specifications and environment	
Power dissipation, continuous duty	2 W/A
Power dissipation, intermittent duty	2 W/A \times duty cycle
Ambient temperature range	0 to 40 °C
Cooling method	Natural convection
Mounting	Vertical (see also general mounting instructions)
Max. ambient temperature with limited current	60 °C, see derating for high temperatures in chart below
Storage temperature range	-20 to 80 °C
Protection degree/pollution degree	IP 20/3
Insulation specifications	
Rated insulation voltage, U _i	660 V
Rated impulse withstand voltage, U _{imp}	4 kV
Installation category	III
Control specifications	
Control voltage (+/- 10%)	24-400 V a.c., 24-00 V a.c.
Control current/neuror may	15 mÅ / 2 VÅ
Response time may	70 mc
FMC immunity	Meets requirements of FN 50082-1 and FN 50082-2
Lavi C minimumy	

Selection guide

Operational voltage	Motor current max.	Motor power max.	Control voltage	Dimensions	Туре	Code no.
24-230 V a.c.	15 A	4.0 kW/5.5 HP	24-480 V a.c./24-60 V d.c.	45 mm module	MCI 15 DOL	037N0054
24-480 V a.c.	15 A	7.5 kW/10 HP	24-480 V a.c./24-60 V d.c.	45 mm module	MCI 15 DOL	037N0055
24-600 V a.c.	15 A	7.5 kW/10 HP	24-480 V a.c./24-60 V d.c.	45 mm module	MCI 15 DOL	037N0056

Wiring and functional diagrams



Mains voltage (L1, L2, L3)	_
Control voltage (A1, A2)	_
Load voltage (T1, T2, T3)	_
LED 2	_

Motor overload and short circuit protection

Overload and short circuit protection of the motor is easily achieved by installing a circuit breaker on the supply side of the motor controller.

Select the circuit breaker from the selection table according to the rated nominal operational current of the motor.

For information on prospective short circuit current please refer to data for circuit breaker.

Motor full load current A	Danfoss CTI 25 circuit breaker Code no.
0.1-0.16	047B3020
0.16-0.25	047B3021
0.25-0.4	047B3022
0.4-0.63	047B3023
0.63-1.0	047B3024
1.0-1.63	047B3025
1.6-2.5	047B3026
2.5-4.0	047B3027
4-6.3	047B3028
6-10	047B3029
10-16	047B3030
Assolutionst MCI 15	

Operating at high temperatures

If the unit is placed inside small cabinets, care must be taken to avoid exceeding the max. ambient temperature. Otherwise the current must be derated according to table.

For further information on dimensions, mounting and temperature overload protection see common information, page 26.

Ambient MCI 15 temperature

40°C	15 A
50°C	12.5 A
60 °C	10.0 A

Reversing contactors Type RCI



Features

- Compact modular design complete with heat sink
- DIN-rail mountable
- Built-in varistor protection
- Operational current up to 10 A (AC-3)
- Line voltage up 480 V a.c.
- Built-in interlock

- Universal control voltage
- Burst firing (zero cross)
- LED status indicator
- IP 20 protection
- Problem-free specification according to industry standard
- Easy and quick installation

	T. You
General	DOL 44
Гуре	RCI IU
Product description	RCI reversing contactors are designed for demanding forward/reverse control of 3-phase AC motors. The zero cross-switching method ensures very fast and precise motor control and virtually eliminates EMC emission. The RCI reversing contactor is ideal where fast switching capability and long life are essential.
Typical applications	Conveyors, thread cutting machines, packaging lines and other applications where fast reversing capabilities are needed.
Design standard	IEC/EN 60947-4-2
Approvals	CE, CSA and NRTL/C
Output specifications	
Operational current	
AC-3 (Motor load)	10 A
AC-4 (Motor load,	
inching, jogging)	8 A
Motor size at: $208-230$ V a c	ΔC_{-3} : 0.1-2.2 kW (0.18-3 HP) ΔC_{-4} : 0.1-1.5 kW (0.18-2 HP)
400-480 V a.c.	AC-3: 0.1-4 kW (0.18-4 HP) AC-4: 0.1-3 kW (0.18-4 HP)
Leakage current max.	5 mA
Minimum operational current	50 mA
Semiconductor protection fusing	
type 1 coordination	35 A gL/gG
type 2 coordination	450 A°S
Thermal specifications	
and environment	
Power dissipation,	1.2 W/A
Power dissipation	
intermittent duty	1.2 W/A \times duty cycle
Ambient temperature range	-5 to 60 °C
Cooling method	Natural convection
Mounting	Vertical (see also general mounting instructions)
Storage temperature range	-20 to 80 °C
Protection degree/pollution	
degree	IP 20/3
Insulation specifications	
Rated insulation voltage, U _i	660 V
Rated impulse withstand	
voltage, U _{imp}	4 kV
Installation category	
Control specifications	
Control voltage (+/- 10%)	5-24 V d.c. / 24-230 V a.c./d.c.
Pick-up voltage	4.25 V d.c. / 20.4 V a.c./d.c.
Control current/neuron mere	1.5 V U.C. / /.2 V A.C./U.C.
Control current/power max.	25 mA at 24 V 0.C. / 6 mA / 1.5 VA at 24 V 0.C.
Response une max.	
forward and reverse may	20 m seconds
EMC immunity	Neets requirements of ENI 50092 1 and ENI 50092 2
ENIC minumy	

Selection guide

Operational voltage	Motor current max.	Motor power max.	Control voltages	Dimensions	Туре	Code no.
208-230 V a.c.	10 A	2.2 kW/3 HP	5-24 V d.c.	45 mm module	RCI 10	037N0044
	10 A	2.2 kW/3 HP	24-230 V a.c./d.c.	45 mm module	RCI 10	037N0043
400-480 V a.c.	10 A	4 kW/5.5 HP	5-24 V d.c.	45 mm module	RCI 10	037N0044
	10 A	4 kW/5.5 HP	24-230 V a.c./d.c.	45 mm module	RCI 10	037N0043

Wiring and functional diagrams





Motor overload and short circuit protection

Overload and short circuit protection of the motor is easily achieved by installing a circuit breaker on the supply side of the motor controller.

Select the circuit breaker from the selection table according to the rated nominal operational current of the motor.

For information on prospective short circuit please refer to data for circuit breaker.

Motor full load current A	Danfoss CTI 25 circuit breaker Code no.
0.1-0.16	047B3020
0.16-0.25	047B3021
0.25-0.4	047B3022
0.4-0.63	047B3023
0.63-1.0	047B3024
1.0-1.63	047B3025
1.6-2.5	047B3026
2.5-4.0	047B3027
4-6.3	047B3028
6-10	047B3029

Temperature overload protection

Thermal overload protection of controller



Optional thermal overload protection is possible by inserting a thermostat in the slot on the right-hand side of the controller.

Order: UP62 thermostat 037N0050

Wiring of overload protection



The thermostat is connected in series with the control circuit of the main contactor. When the temperature of the heat sink exceeds 100 °C the main contactor will be switched OFF. A manual reset is necessary to restart this circuit.

Mounting instruction in mm (inches)





If unit is mounted horizontally, derate current by 50%. Keep heat sink clean. Airflow should not be blocked.

U O	ि		പ		
000	000	000	000	000	000
000	000	000	000	000	000
ທີ	ໜ່	ີທີ	ີທ	ີທີ	ີທີ



Dimensions in mm (inches)

Type ECI 15











Type ACI 15, ECI 30, MCI 15, TCI 15, TCI 25, RCI 10, and MCI 15DOL



Type MCI 25, MCI 25B



Contactors and motor controllers

Pressure and temperature controls

One call and you're in control

One call to Danfoss gives you access to an entire range of high-quality industrial controls. The Danfoss line encompasses components for industrial monitoring and control systems based on the principles of pressure and temperature measurement, electrical power, and fluid control, and includes:

- Electro-mechanical contactors
- Electronic contactors and motor controllers
- Pressure and temperature switches
- Pressure transmitters
- Temperature sensors and transmitters
- Solenoid valves
- Externally operated valves
- Thermostatically operated valves

Given their important monitoring and control functions, Danfoss components are designed for accuracy, reliability and long life. And our determination to guarantee a high-quality product is matched by an equally strong commitment to customer service. A specialist in the Danfoss industrial controls group can advise you on product selection and configuration, based on long experience in your industry. You'll find that with sales and service centers in over 100 countries, Danfoss is usually only a local call away.

Danfoss can accept no responsibility for possible errors in catalogues, brochures and other printed material. Danfoss reserves the right to alter its products without notice. This also applies to products already on order provided that such alterations can be made without subsequential changes being necessary in specifications already agreed. All trademarks in this material are property of the respective companies. Danfoss and the Danfoss logotype are trademarks of Danfoss A/S. All rights reserved.



Industrial valves

Danfoss Limited

Perivale Industrial Park Horsenden Lane South Greenford Middx. UB6 7QE Telephone: 0181-991 7000 Telefax: 0181-991 7171