



Agenda

- Introduction and features
- Product comparison
- Software tools
- Technical information
- Configuration & accessories
- Service policy & spare parts



iC2-Micro in brief









iC2-Micro

Perfect match for a wide and varied range of industrial and HVAC applications, with compact size

| Voltage rating | T4: 3 x 380-480 VAC S2: 1 x 200-240 VAC -15%/+10% |
|-----------------------------------|---|
| Power rating (Nominal current) | T4: 0.37-22 kW (1.2-43 A) S2: 0.37-2.2 kW (2.2-9.6 A) |
| Protection rating | IP20 (IP21 as option) |
| EMC compliance | T4: C4 & C2 S2: C4 & C1 |

Compatible with VLT® Micro Drive FC 51

- EMC performance
- Physical dimension

High overload

- 150% 60 s
- 200% 1 s at start

Built-in control panel with potentiometer

Multi-language texts in control panel as option

Integrated RS485 Modbus

Global approvals













Compact, reliable, flexible & powerful

Save system cost, save panel space, reduce installation time, improve production efficiency

Compact design Book-style mounting Built-in EMC filter,

brake chopper and

control panel

Save panel space Reduce system cost



Free choice of motor

Freely select the best-fit motor Ready to optimize for the application IM, IPM, SPM



Global product offering

Global certifications Global AMS support



Application expert

Application oriented startup wizards and parameter group

Low-complexity commissioning



Offline drive configuration

customers' parameter view and default values

Reduces safety risk in **OEM** operations Improves production efficiency



Easy for retrofit

Same physical dimension as VLT® Micro Drive FC 51, or even smaller









Fit for your application

You can use the same drive in diverse processes, since the iC2-Micro is designed to optimize a wide range of applications such as

- Pumps
- Fans
- Material handling
- Conveyors
- Mixers
- Packaging machines
- Palletizers
- Textile machinery

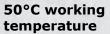






High reliability in harsh environments





A robust full-load performance at high temperatures means there is no need to install extra cooling equipment, nor to oversize the drive



Coated printed circuit board

Long reliable product life in tough environments



No forced air over PCB

Inbuilt protection based on good design, for extended PCB life



Removeable fan (on/off control)

Save time and cost with streamlined mounting and service. Certain drives in the range have a removable fan to make maintenance easy, improve the cooling efficiency, and reduce service cost



Natural cooling

Certain drives in the range are naturally cooled, which lowers energy consumption and ensures silent operation

Free choice of motor

iC2-Micro is widely compatible and ready to optimize motors:

- Induction motors IM
- PM motors: both SPM and IPM

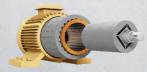
Induction motor

- 0-200 Hz (VVC+ mode)
- 0-500 Hz (U/f mode)

PM motor

0-400* Hz (VVC+ mode)

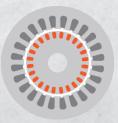




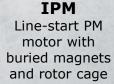


IM

Three-phase induction motor with copper rotor

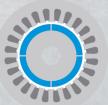






SPM

Surface-mounted PM motor with copper rotor magnets





Built-in control panel

Intuitive control panel

simplifies commissioning, operation, and service. The control panel features a 6-digit 7segment LED display, status indicators, clear navigation buttons, and built-in frequency setting potentiometer.



| Operation | Operation keys, potentiometer | | | | | | |
|-------------|---|--|--|--|--|--|--|
| Symbol | Function | | | | | | |
| | Toggles between status display and main menu Long press to access the shortcut menu for quickly reading and editing required parameter* | | | | | | |
| ^ V | Switches status/parameter group/parameter numbers and tunes the parameter values | | | | | | |
| | Moves the cursor 1 character to the left | | | | | | |
| ♦ | Navigates to the previous step in the menu structure or cancels the setting during tuning parameter values | | | | | | |
| OK | Confirms the operation | | | | | | |
| BE)/ LOC | Toggles between remote and local mode | | | | | | |
| | Starts the drive in local mode | | | | | | |
| | Stops the drive in local mode, or resets the drive to clear a fault | | | | | | |
| | Changes the reference value when the reference value is selected as potentiometer | | | | | | |

| Indicator | S | | |
|-----------|------------------------------------|-----------|--|
| Indicator | Function | Indicator | Function |
| MON | Shows the drive status | LOC | The drive is in local mode |
| PAR | The drive is in programming status | REV | The drive is in reverse direction |
| TOR | The drive is in torque mode | ST2 | Multiple setups indication |
| WARN | Keeps on when a warning occurs | | On: The drive is in normal operation |
| READY | Keeps on when the drive is ready | RUN | Off: The drive has stopped |
| FAULT | Flashes when a fault occurs | KON | Flash: In the motor-stopping process; or the drive received a RUN command, but no frequency output |

User-friendliness

- 2.0" monochrome display
- Multi-language support
- Parameter copy and download
- Easy for connection with RJ45 port
- Remote mounting kits



- Software update
- Parameter setting
- Online monitoring (scope)
- Command line
- Drive customizer for logic & sequence control



- Parameter setting and downloading w/o drive power on
- Tool transfers message between PC tool (MyDrive) and control card





User-friendliness

Control Panel 2.0 OP2

- An optional (accessory) control panel which provides better user experience.
- This type of control panel enables to easily set up the drive via parameters, monitor drive status, and visualization of event notifications.
- It also support parameters copy and download. Remote mounting kits are available for mounting the Control Panel 2.0 OP2 in the cabinet door as well.



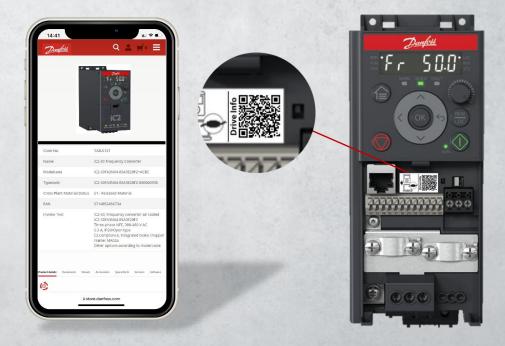




User-friendliness

QR code on front label

- Scan QR code with smart device to access to product details page in the Product Store, and access to product information, including product type, SN number, PN number, technical data and access to related technical literatures, drawings, service, etc.
- Scan QR code with scanner to know product production information like SN and PN numbers from URL

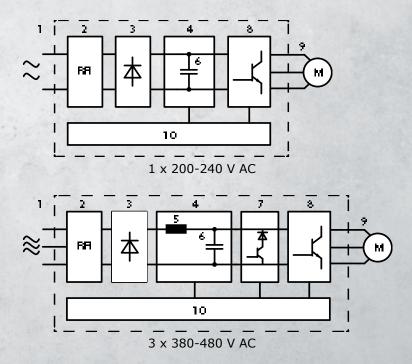




Topological structure

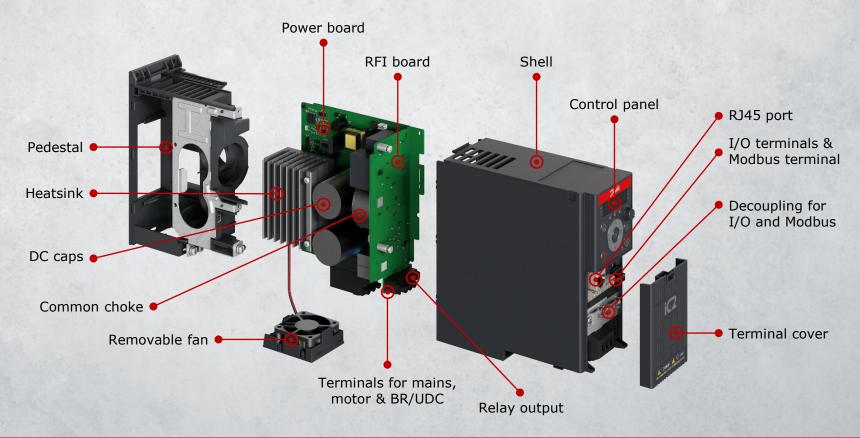
| 1 | Mains input | | | |
|----|-----------------------------|--|--|--|
| 2 | RFI filter | | | |
| 3 | Rectifier | | | |
| 4 | DC bus | | | |
| 5 | DC reactor ¹⁾ | | | |
| 6 | Capacitor bank | | | |
| 7 | Brake chopper ²⁾ | | | |
| 8 | Inverter | | | |
| 9 | Output to motor | | | |
| 10 | Control circuitry | | | |

- 1) DC reactor is only applicable to MA05a
- 2) Brake chopper is not applicable to MA01a





Drive structure, MA02a



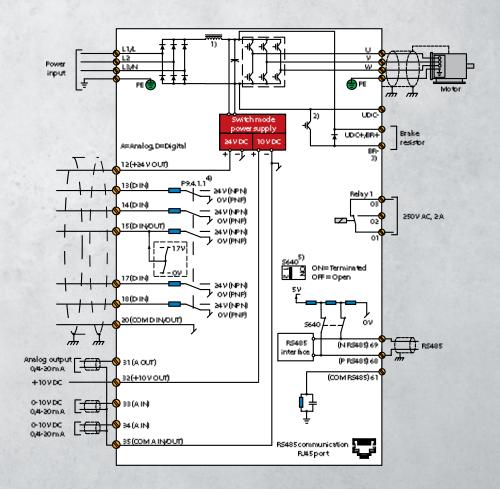


Terminals

| | Terminal number | Туре | Comment |
|----------------------|------------------|-------|---|
| | T12 | 24V | Maximum load: 100 mA |
| | T13 | DI1 | |
| | T14 | DI2 | |
| I/0s | T15 | DIO | Could be set as digital output, maximum output current: 40 mA Could be set as pulse output (4 Hz – 32k Hz) |
| • 4 DI | T17 | DI3 | |
| • 1 DIO • 2 AI | T18 | DI4 | Could be set as pulse input (4 Hz – 32k Hz) |
| • 1 AO | T20 | GND | |
| • +24 V | T31 | AO1 | Current mode |
| • +10 V | T32 | 10V | Maximum load: 25 mA |
| | T33 | AI1 | Voltage or current mode selection set by parameter |
| | T34 | AI2 | Voltage or current mode selection set by parameter |
| | T35 | GND | |
| | Terminal type | | Spring type |
| | PNP & NPN | | By software parameter |
| | 61 | Com | |
| RS485 | 68 | Р | |
| | 69 | N | |
| Relay | 01, 02, 03 | NO/NC | |
| Mains | L1(L), L2, L3(N) | | Switch |
| Motor | U, V, W | | |
| | UDC- | | RS485 |
| Load sharing & brake | UDC+/BR+ | | 2 9 H S 7 S 20 31 22 39 34 35 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |
| | BR- | | |
| | | | |

Wiring schematic







EMC compatibility and motor cable length

2 versions based on different EMC filter types:

- Drive with built-in FMC filter.
- Drive without built-in EMC filter

| Drive with built-in EMC filter | Maximum motor cable length (shielded), @4kHz | | | | | |
|--------------------------------|--|----------------|--|--|--|--|
| Drive with built-in EMC litter | C1 (Conducted) | C2 (Conducted) | | | | |
| 1 x 200-240 V | 5 m (16.4 ft) | - | | | | |
| 3 x 400-480 V | - | 15 m (49.2 ft) | | | | |

- Drive with built-in EMC filter fulfills radiated emission C2 limits.
- Drive without built-in EMC filter fulfills conducted/radiated emission C4 requirements, and shielded motor cable is recommended.

The drive is designed to operate with optimum performance within the maximum motor cable lengths:

| Maximum motor cable length (shielded) | Maximum motor cable length (unshielded) |
|---------------------------------------|---|
| 50 m (164 ft) | 75 m (246 ft) |

Note: The drives are designed to comply to the EMC product standard, EN/IEC 61800-3.

F1 = C1/C2 Public Environment & Industrial Environment

= C2 Public Environment & Industrial Environment

F3 = C3 industrial environment

F4 = C4 System Component (IT Network)

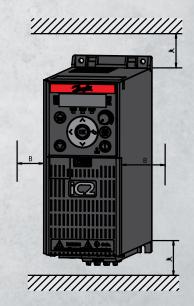


Mounting clearance

| | Enclosure size | Minimum mounting clearance [maximum temperature 50 °C (122 °F)] |
|--|--------------------------|---|
| | All enclosure sizes | Above and below (A): 100 mm (3.9 in) |
| | MA01a-MA05a, MA02c | Sides (B): 0 mm (0 in). |
| A STATE OF THE STA | MA01c (natural cooling*) | Sides (B): 0 mm (0 in) for 40 °C (104 °F), 10 mm (0.39 in) and above for 50 °C (122 °F) |

iC2-Micro is designed to operate at 50 °C ambient temperature at full constant output current and up to 55 °C with derating.







^{*}Note: MA01c drives (S2 0.37 & 0.75kW) are natural cooling

Improvements and add-on new features

Improvements



- UL61800-5-1 vs. UL508C.
- Cooling fan: on/off vs always running
- Replaceable cooling fan vs fixed
- Max. cable length 75m vs 50m
- DI/O (Max. output 40mA) vs DO 20mA output
- Improved AMA vs AMT
- Pulse input with 32k Hz vs 5k Hz
- Process control PID vs Only PI
- RS-485 (115K com. speed) vs 38.4K
- Full load at 50 °C vs 40 °C
- Spring type IO terminals vs screw type
- Improved mechanical brake performance
- Two variants for C2 and C4 (EMC)
- Better output frequency resolution
- Improved potentiometer
- AI linearity improvement

New functionalities

PM motor control

Quick Access for setting wizard & Application Selections

Natural cooling up to 0.75kW for 1-phase 200v drives

> MyDrive® Insight compatibility

Breakaway current 200% 1s

Protection- locked motor detector

Input phase loss trip

Latch start reverse

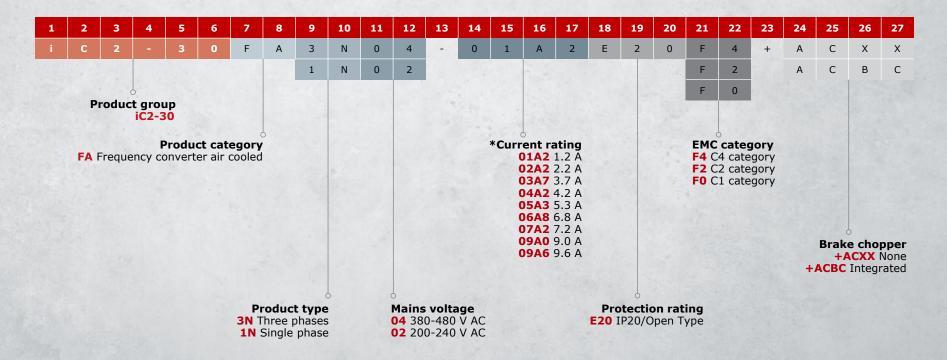
Torque open loop control

Built-in control panel with potentiometer

Kinetic backup

& more...

Ordering model code



^{*} See power rating on slide 5



Variants and frame designations

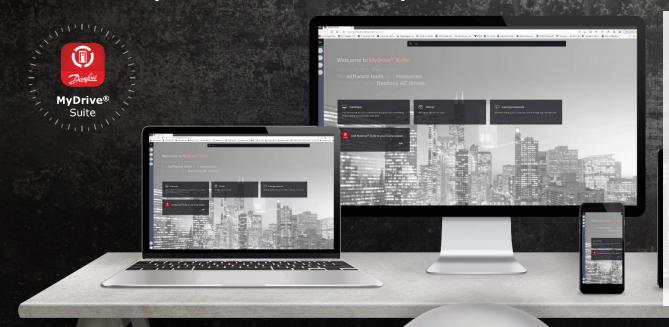
| | | Frame designation | | MA01a | | MA02a | | MA03a | | MA04a | | MA05a | | |
|---|-----------|------------------------------|-----------|----------------|------|---------|-------|-------|------|-------|------|-------|------|------|
| 9 | | Drive type | 01A2 | 01A2 02A2 03A7 | | 05A3 | 07A2 | 09A0 | 12A0 | 15A5 | 23A0 | 31A0 | 37A0 | 43A0 |
| 1 | | Power rating [kW] | 0.37 | 0.37 0.75 1.5 | | 2.2 | 3.0 | 4.0 | 5.5 | 7.5 | 11.0 | 15.0 | 18.5 | 22.0 |
| 8 | | Nominal current [A] | 1.2 | 2.2 | 3.7 | 5.3 | 7.2 | 9.0 | 12.0 | 15.5 | 23.0 | 31.0 | 37.0 | 43.0 |
| 1 | 3-phase | Non-built-in EMC filter (C4) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 9 | 380-480 V | Built-in EMC filter (C2) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 8 | | Built-in brake chopper | X | X | X | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | | Dimensions | O C | | (A) | | | | | | | | | |
| 9 | | Frame designation | MA01c | | MA02 | c M | IA02a | | | | | | | |
| 3 | | Drive type | 02A2 04A2 | | 06A8 | | 09A6 | | | | | | | |
| á | | Power rating [kW] | 0.37 | | 0.75 | 1.5 2.2 | | | | | | | | |
| 9 | | Nominal current [A] | 2.2 | | 4.2 | 6.8 9.6 | | 9.6 | | | | | | |
| 9 | 1-phase | Non-built-in EMC filter (C4) | ✓ | | ✓ | ✓ | | ✓ | | | | | | |
| | 200-240 V | Built-in EMC filter (C1) | ✓ | ✓ ✓ | | ✓ | | ✓ | | | | | | |
| 9 | | Built-in brake chopper | X X | | X X | | | | | | | | | |
| | | Dimensions | by study | | CZ | | (C2 | | | | | | | |

Dimensions and weights



| Enclosure size | Voltage type | Power rating [kW] | Height H [mm (in)] | Width W [mm (in)] | Depth D [mm (in)] | Height H1 [mm (in)] | Width W1 [mm (in)] | Weight IP20 [kg] |
|-------------------|-----------------|-------------------------|-----------------------|----------------------|----------------------|------------------------|-----------------------|------------------------|
| MA01c | | 0.37 | 150 (5.9) | 70 (2.8) | 143 (5.6) | 140.4 (5.5) | 55 (2.2) | 1.0 |
| MA01c | 1-phase | 0.75 | 150 (5.9) | 70 (2.8) | 143 (5.6) | 140.4 (5.5) | 55 (2.2) | 1.0 |
| MA02c | 200-240 V | 1.5 | 176 (6.9) | 75 (3.0) | 157 (6.2) | 150.5 (5.9) | 59 (2.3) | 1.3 |
| MA02a | | 2.2 | 186 (7.3) | 75 (3.0) | 175 (6.9) | 176.4 (6.9) | 59 (2.3) | 1.6 |
| MA01a | | 0.37 | 150 (5.9) | 70 (2.8) | 158 (6.2) | 140.4 (5.5) | 55 (2.2) | 1.1 |
| MA01a | | 0.75 | 150 (5.9) | 70 (2.8) | 158 (6.2) | 140.4 (5.5) | 55 (2.2) | 1.1 |
| MA01a | 3-phase | 1.5 | 150 (5.9) | 70 (2.8) | 158 (6.2) | 140.4 (5.5) | 55 (2.2) | 1.1 |
| MA02a | 380-480 V | 2.2 | 186 (7.3) | 75 (3.0) | 175 (6.9) | 176.4 (6.9) | 59 (2.3) | 1.6 |
| MA02a | | 3 | 186 (7.3) | 75 (3.0) | 175 (6.9) | 176.4 (6.9) | 59 (2.3) | 1.6 |
| MA02a | | 4 | 186 (7.3) | 75 (3.0) | 175 (6.9) | 176.4 (6.9) | 59 (2.3) | 1.6 |

MyDrive® Suite ensures your digital tools are only one click away



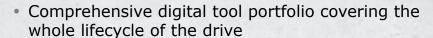
MyDrive® Suite brings all your tools together to support you during engineering, operation and service. What is MyDrive® Suite? It's a tool providing a single point of access for the other digital tools supporting you during engineering, operation and service, thereby covering the whole life cycle of the drive.

Try MyDrive® Suite today: suite.mydrive.danfoss.com

MyDrive® tools

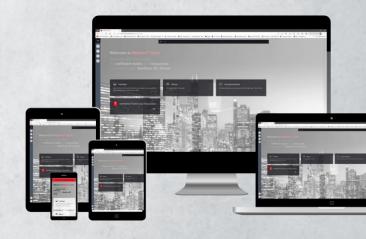






- Access the tools through different platforms
- Integrate tools into your systems and business processes
- Data is synchronized, ensuring information is always correct and up to date





Select & dimension

MyDrive® Select

Validate performance

MyDrive® ecoSmart
 MyDrive® Harmonics

Setup and service

MyDrive[®] Insight

MyDrive® Insight – Features in brief

MyDrive® Insight is a platform-independent software tool that supports commissioning, engineering, and monitoring of your drive

- Fast and easy configuration and commissioning
- Monitor the drives as part of daily operation
- Collect data and information for troubleshooting, maintenance, and service
- Discover and access multiple drives in a network
- Intuitive user interface
- Notifications and visualizations on real time drive information and events
- PC control for operations such as starting or stopping the drive, setting references, setting direction, reset, and coast of the drive
- Perform updates on single or multiple drives
- Back up and restore parameter settings

Accessories

| Category | Code number | Part name |
|----------|-------------|------------------------------|
| 132G0234 | | Control Panel 2.0 OP2 |
| | 132G0235 | Surface Mounting kit OA2 |
| 132G0236 | | Flush Mounting kit OA2 |
| - | 132G0237 | Control Panel Cable 1.5m OA2 |
| | 132G0238 | Control Panel Cable 3m OA2 |

| Category | Code number | Part name |
|----------------------------------|-------------|---|
| ing ng | 132G0202 | Decoupling plate mounting kit, MA01c |
| coupl plate ountii kits | 132G0203 | Decoupling plate mounting kit, MA02c |
| | 132G0204 | Decoupling plate mounting kit, MA01a |
| De | 132G0205 | Decoupling plate mounting kit, MA02/03a |

| Category | Code number | Part name | |
|------------------------|-------------|-----------------------------------|--|
| e 1 on | 132G0188 | IP21/Type 1 conversion kit, MA01c | |
| rypersic rsic ts | 132G0189 | IP21/Type 1 conversion kit, MA02c | |
| 11/ inve ki | 132G0190 | IP21/Type 1 conversion kit, MA01a | |
| COL | 132G0191 | IP21/Type 1 conversion kit, MA02a | |

| Category | Code number | Part name | |
|-----------------------------|-------------|------------------------------|--|
| NEMA 1 onversion kits | 132G0195 | NEMA 1 conversion kit, MA01c | |
| | 132G0196 | NEMA 1 conversion kit, MA02c | |
| | 132G0197 | NEMA 1 conversion kit, MA01a | |
| | 132G0198 | NEMA 1 conversion kit, MA02a | |

| Category | Code number | Part name |
|-----------|-------------|--|
| Connector | 132G0195 | Connector for common DC/brake resistor |

HMI and related accessories

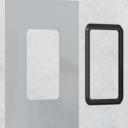


Control Panel 2.0 OP2









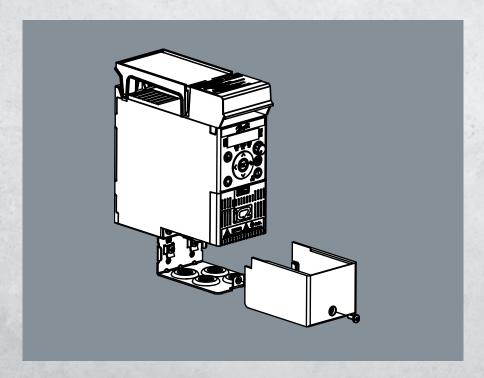




Surface Mounting kit OA2

Flush Mounting kit OA2

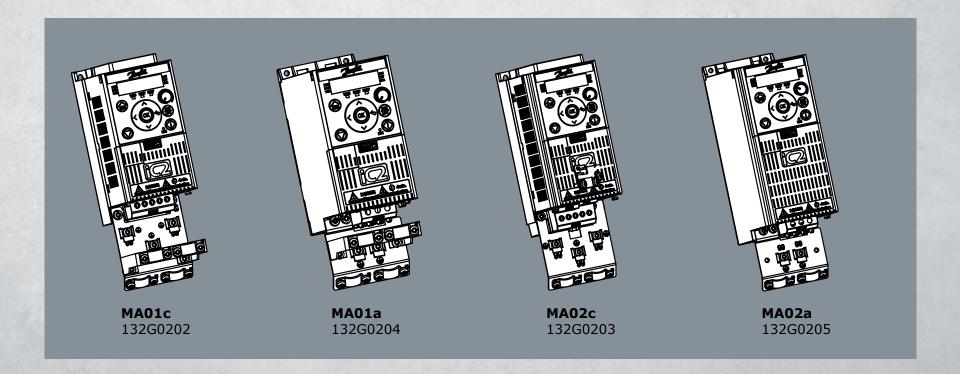
IP21/type 1 conversion kit



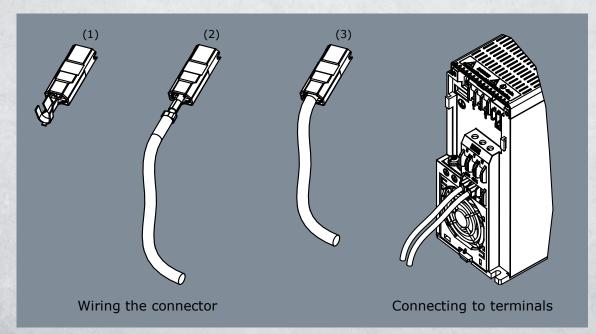
| Kit number | Kit description |
|------------|-----------------------------------|
| 132G0188 | IP21/Type 1 conversion kit, MA01c |
| 132G0189 | IP21/Type 1 conversion kit, MA02c |
| 132G0190 | IP21/Type 1 conversion kit, MA01a |
| 132G0191 | IP21/Type 1 conversion kit, MA02a |

| Item | Quantity | |
|---------------------|------------------------------------|--|
| Top cover | 1 | |
| Metal plate | 1 | |
| Rubber grommet | 4-5 (depends on frame designation) | |
| Bottom cover | 1 | |
| U-terminal | 2-3 (depends on frame designation) | |
| M4x10 screw | 3-4 (depends on frame designation) | |

Decoupling plate mounting kit



Connector for common DC/brake resistor



| Category | Terminals | |
|--------------|-------------------|--|
| Load sharing | -UDC and +UDC/+BR | |
| Brake | -BR and +UDC/+BR | |

| Code number | Part name | |
|-------------|--|--|
| 132G0195 | Connector for common DC/brake resistor | |

Recommended connector type (only for MA01a, MA02a & MA03a): Ultra-pod fully insulated FASTON receptacles and tabs, 521366-2, TE connectivity.

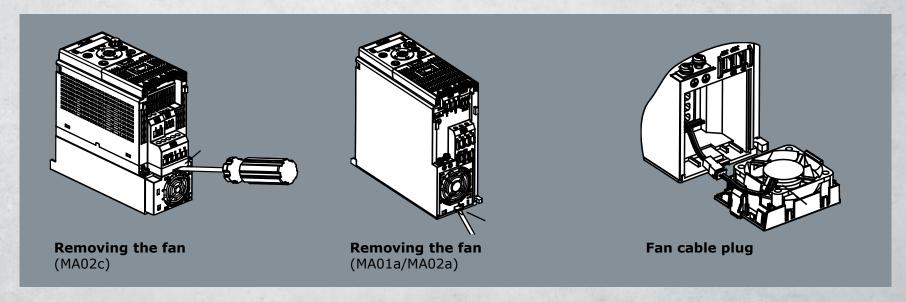
Spare parts

Spare parts

- Cooling fans
- Spare parts kit (RS485 terminal, terminal cover)

| | Part number | Part description |
|--|-------------|------------------------|
| fans | 132G0215 | Cooling fan, MA02c |
| | 132G0216 | Cooling fan, MA01a |
| | 132G0327 | Cooling fan, MA02a |
| 132G0221 132G0222 132G0223 132G0224 | 132G0221 | Spare parts kit, MA01c |
| | 132G0222 | Spare parts kit, MA02c |
| | 132G0223 | Spare parts kit, MA01a |
| | 132G0224 | Spare parts kit, MA02a |

Replaceable cooling fan



| Part number | Part description |
|-------------|--------------------|
| 132G0215 | Cooling fan, MA02c |
| 132G0216 | Cooling fan, MA01a |
| 132G0327 | Cooling fan, MA02a |

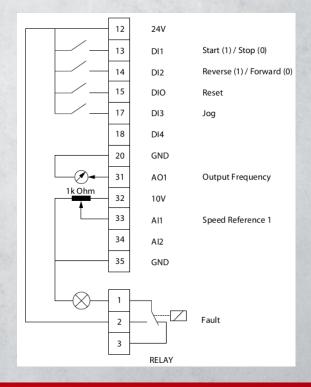


Application Selection (Parameter P5.4.1) can be used to guickly set up the drive for some of the most common application setups. All pre-configured default parameter values for each application selection apply to a specific control configuration.

Speed Control Mode: [20]

The default mode in selection function. The mode is used in typical speed control applications where start or stop is controlled with one digital input. For running at a stable speed, drive is controlled by an analog input as reference signal.

This application selection is very common use for pumps, fans, extruder, conveyors and so on.

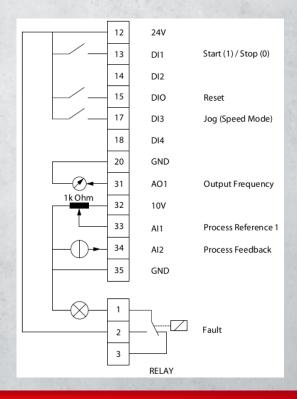


Application Selection (Parameter P5.4.1) can be used to guickly set up the drive for some of the most common application setups. All pre-configured default parameter values for each application selection apply to a specific control configuration.

Process Control Mode: [21]

The mode is suitable for applications which require a value like pressure, flow, temperature, etc. must be kept at a desired level by sensor feedback.

With process control, the frequency converter could be widely used in various fields to help maintain quality, improve performance, increase efficiency, and decrease cost.

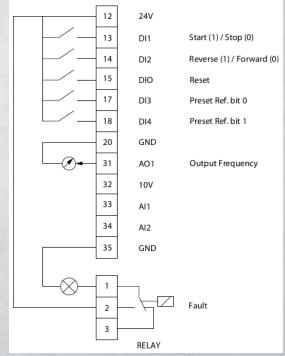


Application Selection (Parameter P5.4.1) can be used to quickly set up the drive for some of the most common application setups. All pre-configured default parameter values for each application selection apply to a specific control configuration.

Multi-speed Control Mode: [22]

The mode is suitable for applications with 4 different speeds by 2 digital inputs. By using one more digital input, 8 speeds are possible.

| | DI 4 - T18 | DI 3 - T17 |
|--------------------|-----------------------|-----------------------|
| Reference | [17] Preset ref bit 1 | [16] Preset ref bit 0 |
| Preset reference 0 | 0 | 0 |
| Preset reference 1 | 0 | 1 |
| Preset reference 2 | 1 | 0 |
| Preset reference 3 | 1 | 1 |



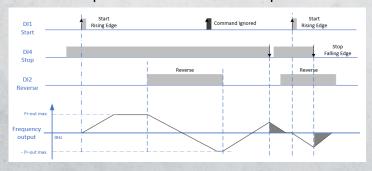
^{*}Note: The preset references selected by digital inputs should be set in Parameters P5.5.3.10 Preset Reference. Default values are 0.

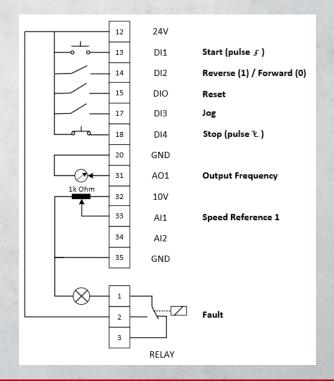


Application Selection (Parameter P5.4.1) can be used to quickly set up the drive for some of the most common application setups. All pre-configured default parameter values for each application selection apply to a specific control configuration.

3-wire Control Mode: [23]

The mode is suitable for typical speed control applications where start or stop is controlled with two push buttons.





Application Selection (Parameter P5.4.1) can be used to quickly set up the drive for some of the most common application setups. All pre-configured default parameter values for each application selection apply to a specific control configuration.

Torque Control Mode: [24]

Suitable for torque control applications which require to control the motor via torque.

