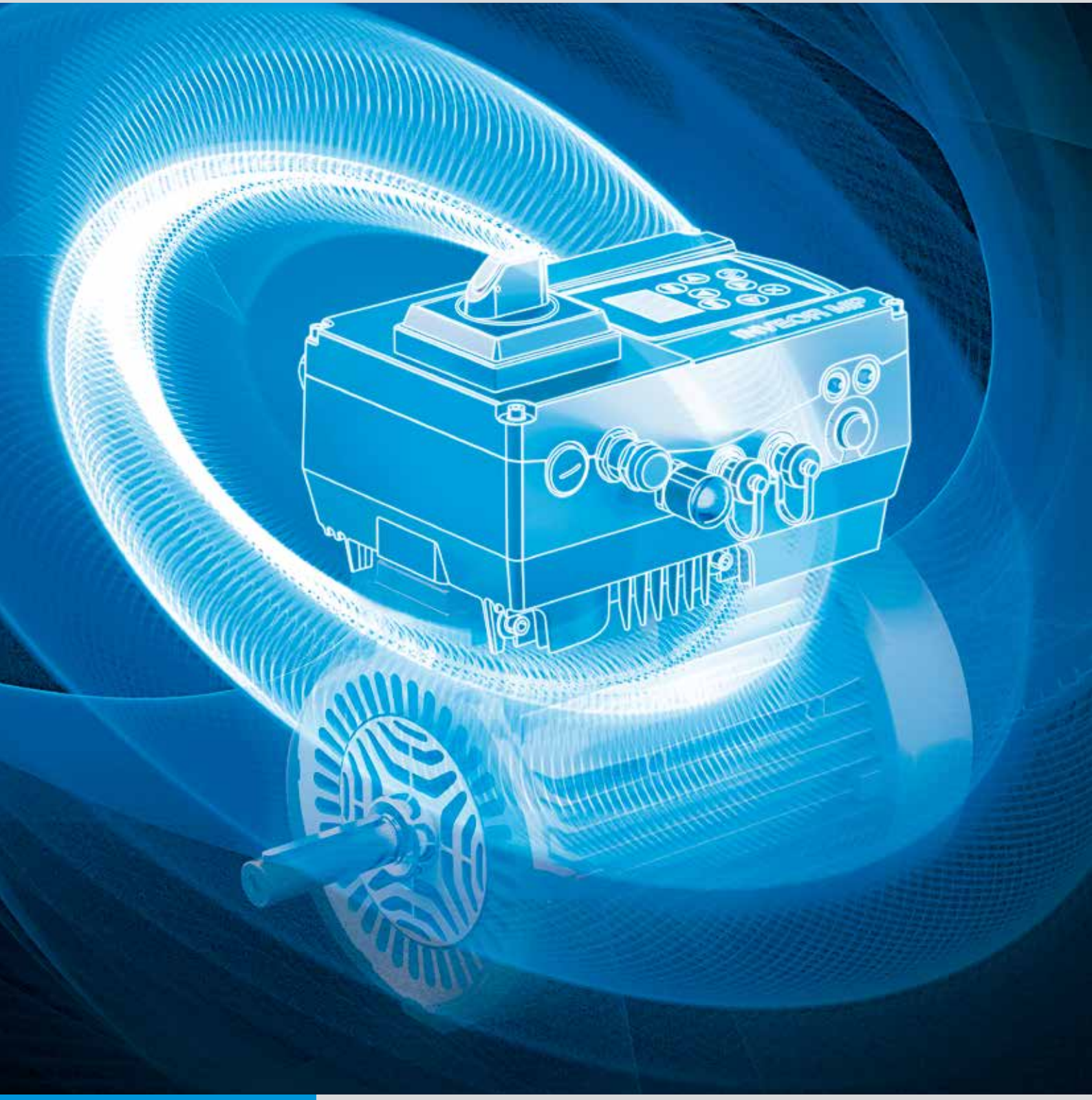
DRIVES TECHNOLOGY

KOSTAL



Smart connections.

Order catalogue

INVEOR frequency inverter

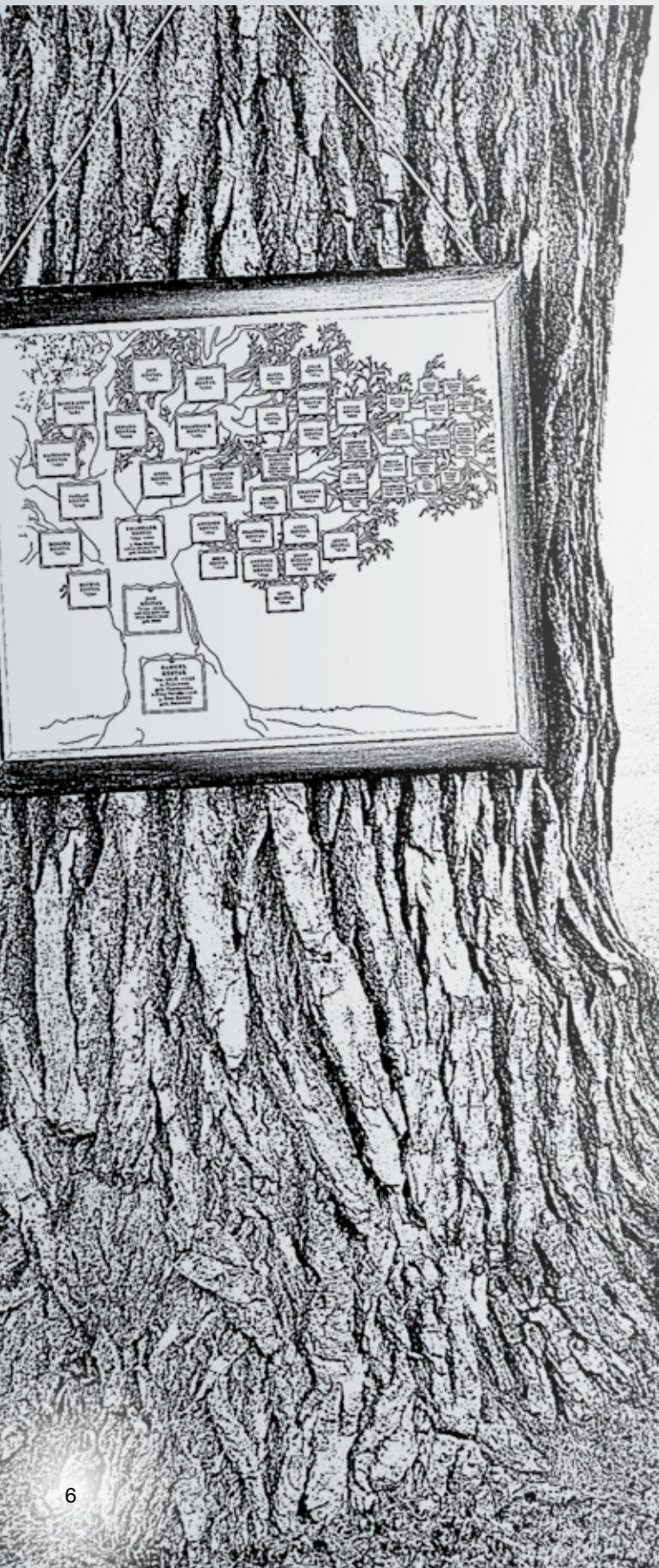
KOSTAL competence –

Using energy the smart way

KOSTAL-competence –
Smart connections


Family
Quality

KOSTAL competence – Smart connections



For over 100 years, KOSTAL has focused on values such as family, partnership, reliability, customer satisfaction, a zero-error approach and awareness of responsibility.

KOSTAL Group

- As an independent, family-owned company, the KOSTAL Group specialises in the development of high-quality electronic, electromechanical and mechatronic solutions for a wide range of automotive and industrial applications.
- The company was founded in 1912 by Leopold Kostal in Lüdenscheid, Germany, and today employs about 19,600 people at 46 locations in 21 countries.
- The KOSTAL Group has four divisions: Automotive Electrical Systems, Connectors, SOMA Test Technology and Industrial Electronics with its international sales company KOSTAL Solar Electric for photovoltaic inverters.
- The KOSTAL Group's partners include the world's leading automotive manufacturers and numerous major industrial companies.

KOSTAL Industrie Elektrik

- With the founding of KOSTAL Industrie Elektrik in 1995 under the umbrella of the KOSTAL Group, the stage was set for providing broad expertise from the automotive sector to additional markets, such as drive technology.
- Based in Hagen, Germany, the leading power electronics firm employs 300 members of staff in development, administration and production.
- Its core competences are drive technology (INVEOR drive controllers) and photovoltaics (PIKO inverters).

Smart connections

- The "Smart connections." philosophy is the KOSTAL brand promise and is based on the KOSTAL Group's vast experience.

„Smart connections.“ – the four pillars of the KOSTAL philosophy

For KOSTAL customers, “Smart Connections.” means a partnership with a down-to-earth and sound company, guaranteeing long-term trusting business relationships at all levels.

KOSTAL family

In dealings with all partners, KOSTAL sees itself as a KOSTAL family, in which each member can rely on the others. This understanding and long-standing relations with our customers guarantee a code of conduct built on human values and tradition.

Partnership based on symbiosis

Using the idea of symbiosis as its guiding principle, by working closely with customers from project planning, qualification and system integration to market launch, KOSTAL is able to deliver optimum support and by treating customers as equals is able to take full account of individual requirements.

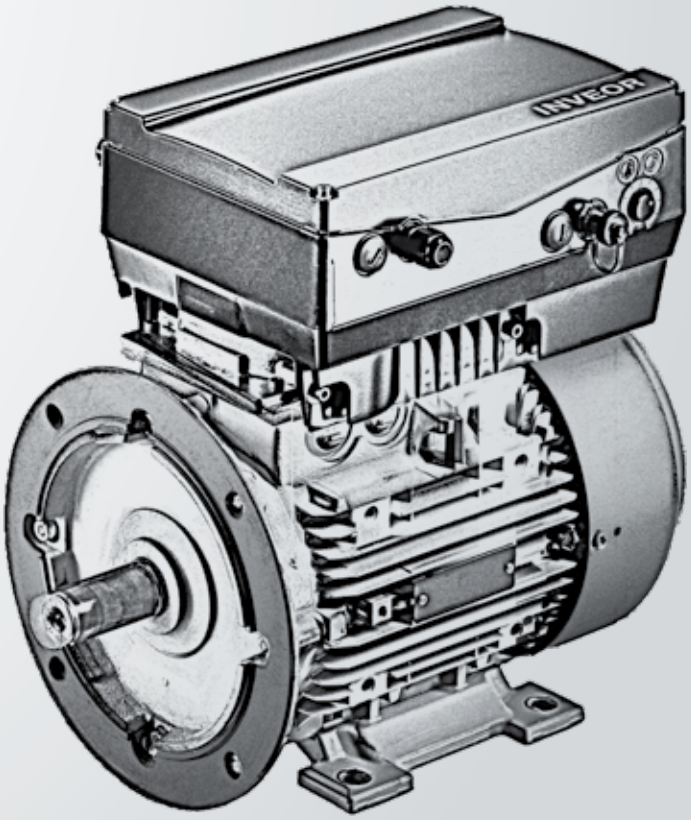
Quality-offensive thinking

The professional error management system – adopted from the automotive industry – guarantees a zero-errors strategy. Highly automated volume production includes defined test loops through which every product passes. KOSTAL offers this partnership-based quality-offensive thinking with the INVEOR, a genuine, German-made quality product. Errors exist to be eliminated and to give us the opportunity to improve day after day, especially for the benefit of KOSTAL customers.

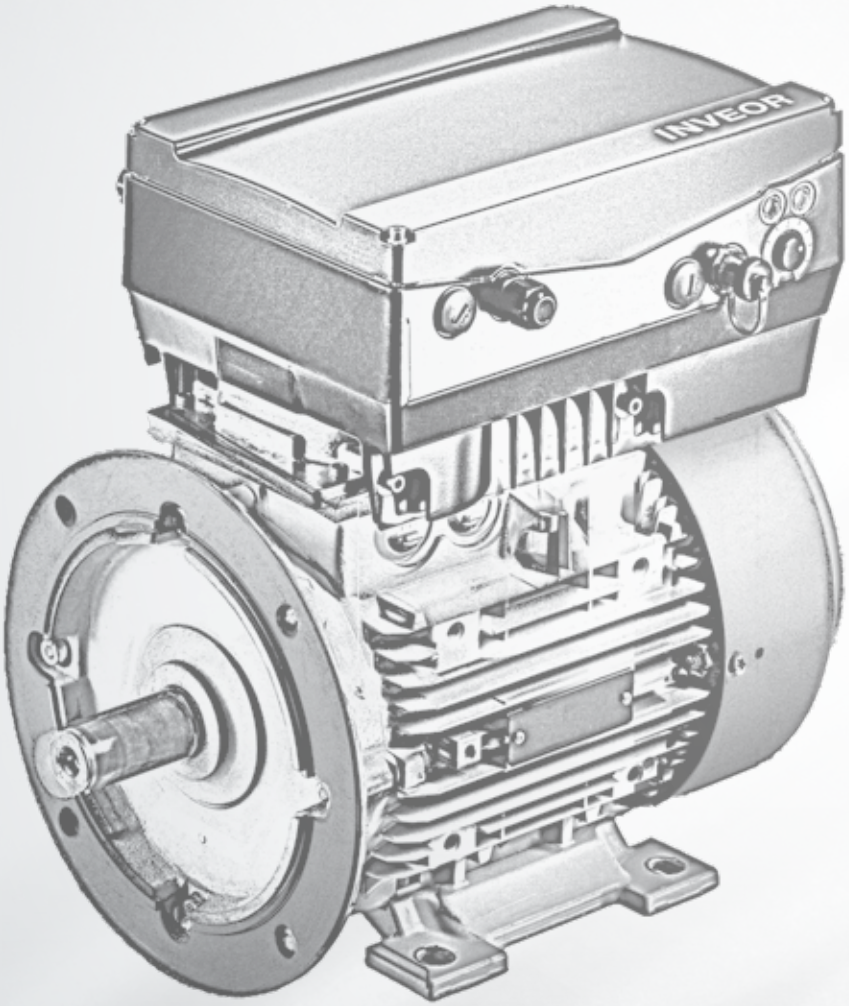
Shaping the future

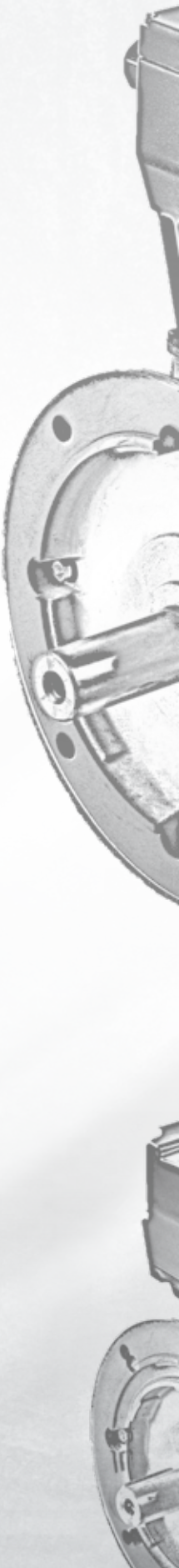
KOSTAL works tirelessly towards active knowledge transfer and intensive dialogue with its partners. Together the challenges presented by constant change can be overcome. The topic of energy efficiency (EN50598) in particular is gaining ever greater significance in this field. In close dialogue with partners, KOSTAL creates new product developments for future requirements. In other words, shaping the future together.

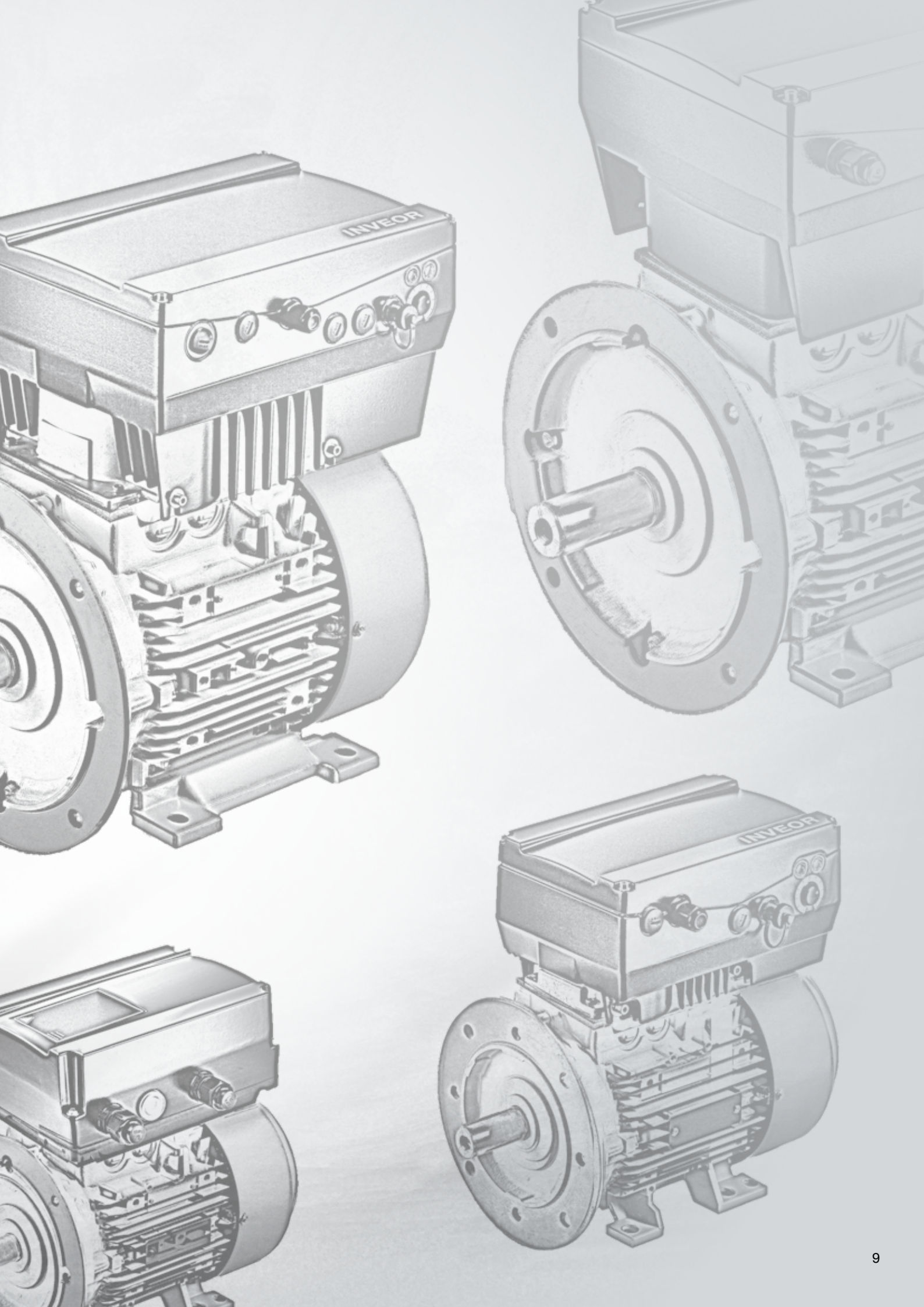
KOSTAL applies its brand promise and its competitive advantages in every aspect of its business activities, of course, this also includes development of the INVEOR line of drive controllers.



INVEOR –
Smart connections on five levels





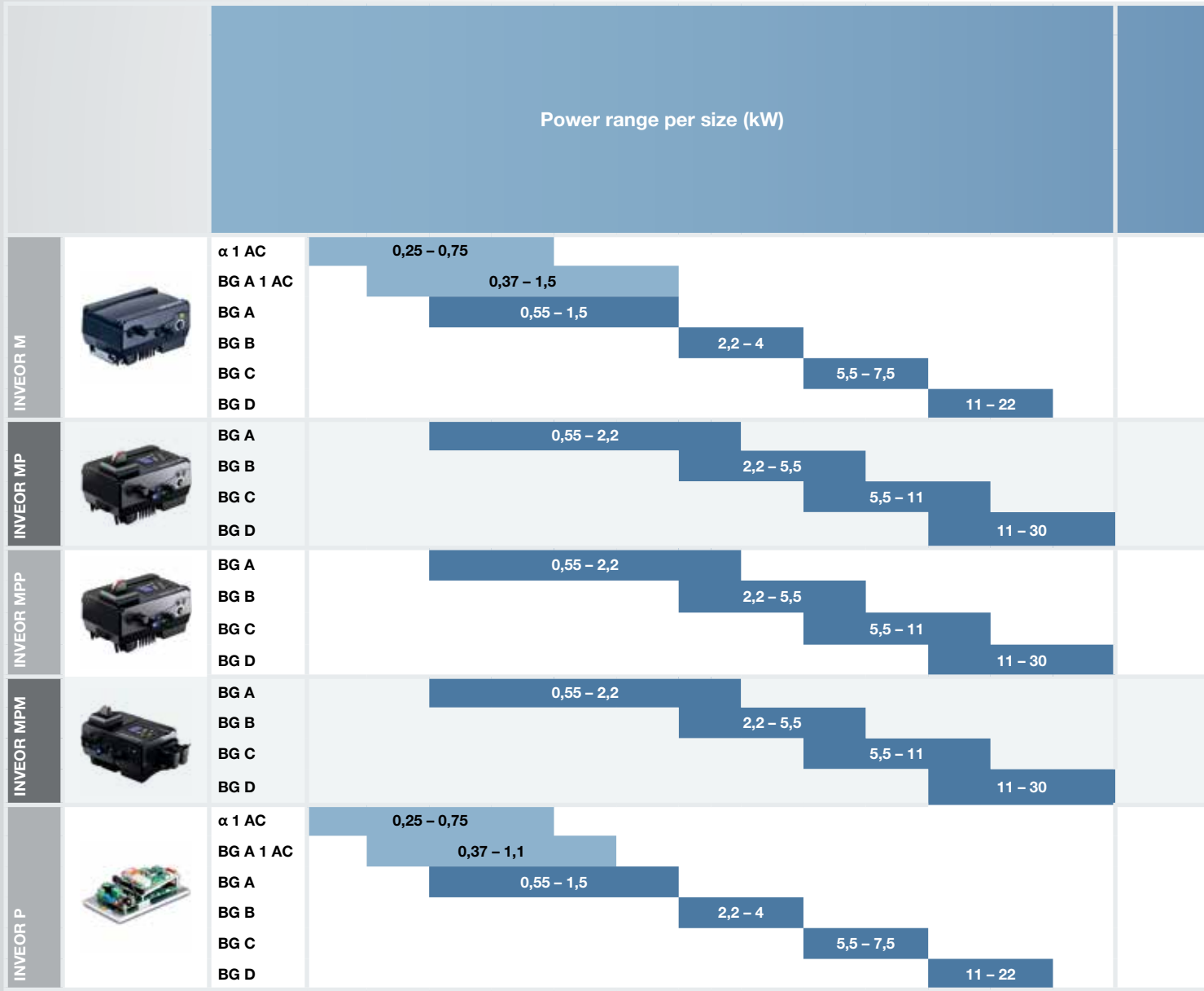

INVEOR
INVEOR

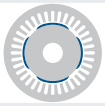
INVEOR –
„Smart connections on five levels.“

The “Smart connections.” claim is not only the brand claim of KOSTAL Industrie Elektrik. It also stands for the philosophy behind the development of the INVEOR line of drive controllers. The goal for INVEOR was to develop a product that is ideally oriented to the requirements of customers and their respective applications without sacrificing the advantages of volume production.

This has resulted in a product with a modular configuration, which customers can put together to suit their needs. On the basis of INVEOR, the key interfaces to the customer application were therefore defined and analysed in order to offer ideal solutions. These solutions, or smart connections, exist at five levels – as is shown on the right.

Overview of INVEOR product families



	Suitability of application							Supported types of motor				
	Pumps	Blowers	Compressors	Industry & automation	Conveyor technology	Door drives	Roller bearing drives	Asynchronous-motor	PMSM (magnets on outside)	IPMSM (magnets on inside)	Synchronous reluctance motor	Synchronous reluctance motor with assistance magnets
												
	■■	■■	■■	■■■	■	■	■	✓	✓	✗	✗	✗
	■■■	■■■	■■■	■■■	■	■	■■■	✓	✓	✓	✓	✓
	■■■	■■■	■■■	■■■	■	■	■	✓	✓	✓	✓	✓
	■■	■■	■■	■■	■■■	■■■	■	✓	✓	✓	✓	✓
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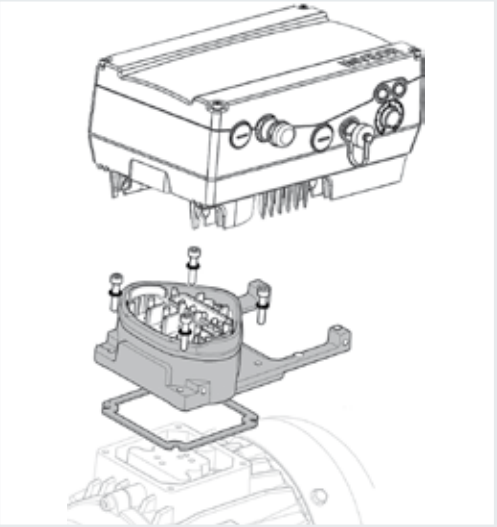
Five levels
at a glance

1 The INVEOR

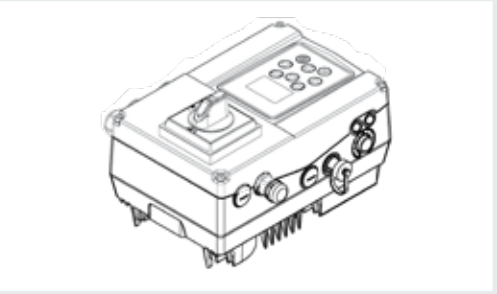


Decentralised drive controller concept

Being installed directly on the motor minimises wiring and installation work and therefore also project planning and installation costs for systems covering large areas. The application section can be extended with ease as no additional space is needed for control cabinets. The individual units can be fully pre-wired, pre-tested and standardised. This makes project planning and commissioning faster than with comparable projects where several drive controllers are fitted in the control cabinet. Shielded motor cables are very short if they are needed at all.

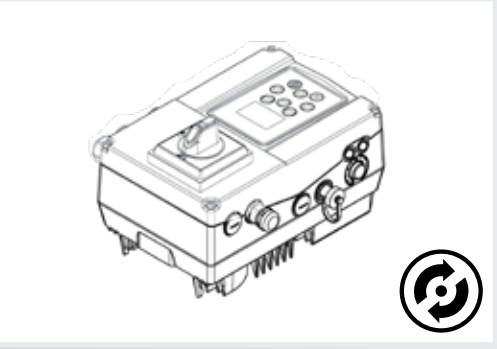
INVEOR M

Robust and efficient drive controller for applications with asynchronous and synchronous motors with extensive equipment, such as fieldbus, Bluetooth, safety, soft PLC.



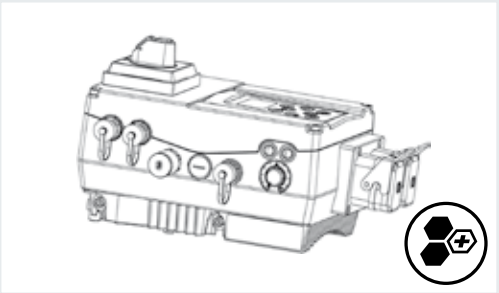
INVEOR MP

Robust and highly efficient drive controller for synchronous, synchronous reluctance and asynchronous motors in the extended speed range. Comprehensive configuration options, such as main switch, integrated brake resistor, fieldbus, Bluetooth and safety make an individual compilation possible.



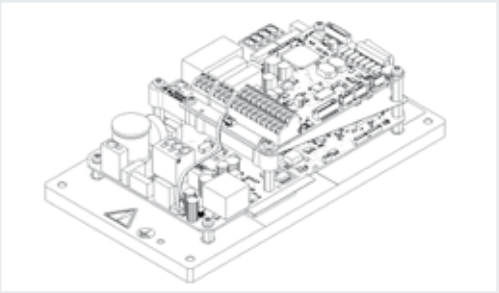
INVEOR MPP

Regardless of the requirements of your pump application, the INVEOR MPP fulfils them all with its numerous, specific pump functions in the best possible way and also saves costs. With the MPP, you can rely on the proven performance characteristics of the INVEOR frequency inverters. In this way, you achieve maximum efficiency with your application, remain as flexible as possible and are optimally equipped for the future.



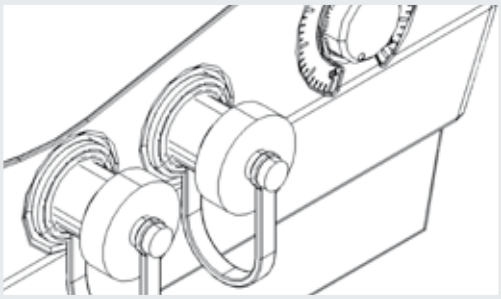
INVEOR MPM

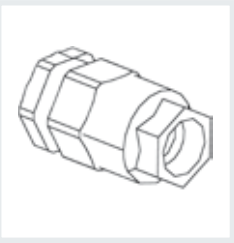
With the INVEOR MPM, all connections can be made using standardised plugs, significantly cutting the installation time. This robust and highly efficient drive controller is designed for synchronous, synchronous reluctance and asynchronous motors in the extended speed range. The entire drive controller functionality is located on one PCB. The space this frees up makes possible an innovative, modular concept, through which the device can be flexibly shaped using optional and I/O modules.



INVEOR P

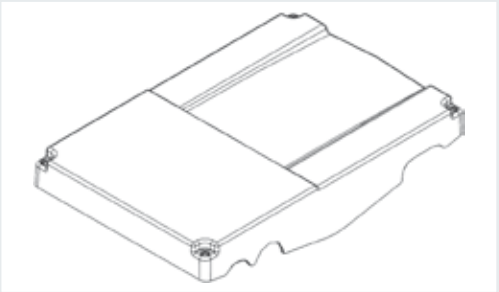
Based on the same platform as INVEOR M, the INVEOR P includes the same electronics hardware on a standardised cold plate.Specific and therefore variable integration in the customer system is thus made possible. The electronics are cooled via the cold plate‘s attachment to the customer‘s cooling surfaces such as installation plates, cast parts or ribbed housing parts. The extensive configuration options, derived from the INVEOR M platform, are still available here. You select the INVEOR type in the configuration.





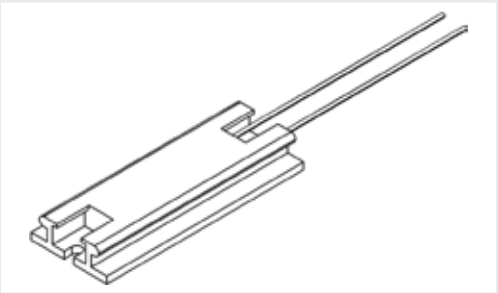
Plug&play as all components feature plug connectors

M12 plug to connect inputs/outputs and fieldbuses. Robust industrial plug connectors from Harting Han Q4/2 allow the supply voltage to be connected rapidly. This option also allows looping in (daisy chain). The QUICKON plug from Phoenix Contact with its convenient displacement connection allows the supply voltage to be connected with ease.



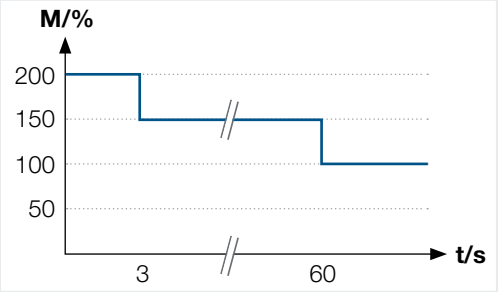
Individual surface

The covers of the INVEOR MP and MPM have a level surface, which allows customers to fit their own controls, for example.



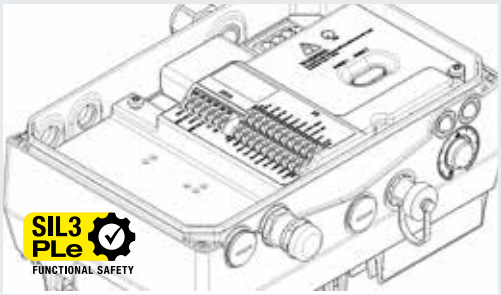
Integrated brake resistor (PTC)

Thanks to the integrated brake resistor, dynamic processes can be undertaken without additional, external brake resistors.



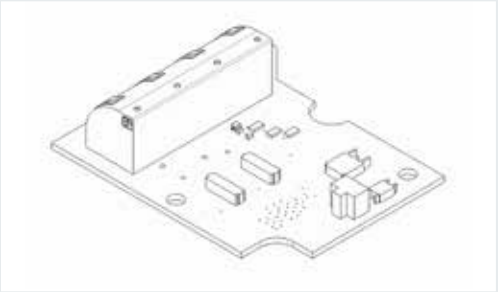
200% overload

For processes with a high starting torque and dynamic ramps, 200% overload is available for 3 seconds and 150% for 60 seconds.



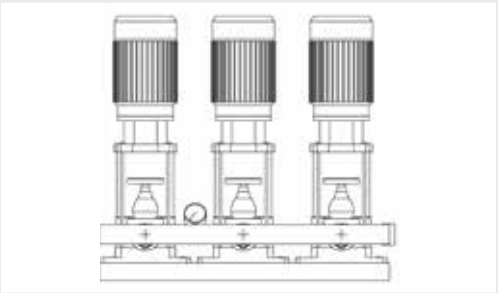
Input/output configuration

The number of inputs/outputs and the model with and without functional safety (STO) can be configured through the choice of integrated application PCB and/or the I/O modules.



Optional modules

Further additional functions, such as a brake module, can be depicted by selecting an optional module.

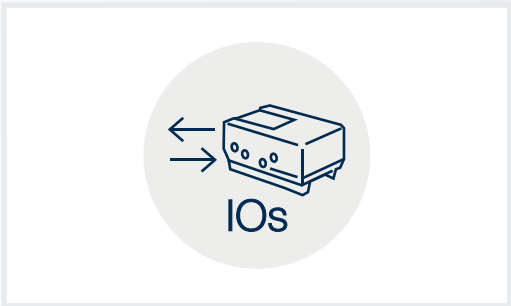


Multiple-pump operation

For applications in which pumps are connected or disconnected depending on demand, for example a booster station, the INVEOR MP and MPP series offers multiple-pump operation. In this scenario up to 6 pumps (1 master, 5 slaves) can be networked with one another using the internal CANopen interface. The INVEOR master monitors the entire process and connects the slave drives if required. Automatic changeover (dependent on operating hours) ensures that the pumps are subject to equal levels of wear.

Smart Sensor

The Smart Sensor is an acceleration sensor that detects vibrations in the application. This data can be used for predictive maintenance.



Bidirektionale IOs

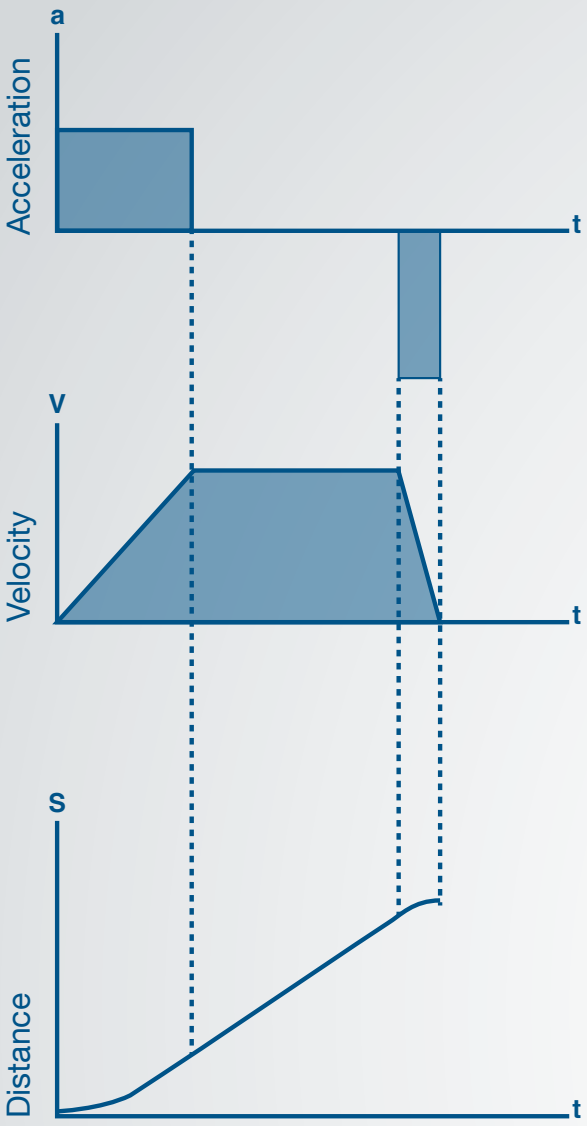
Bidirectional IOs can be assigned as inputs or outputs as desired.This offers the greatest possible flexibility in the use of inputs and outputs.

Temperaturfühlereingang

Possibility of connecting a PT1000 resistance temperature sensor for monitoring and controlling the temperature in the application.

Low Duty Variante

With the Low Duty variant, it is possible to resort to a more cost-effective, smaller size and still obtain the same performance as the original size.

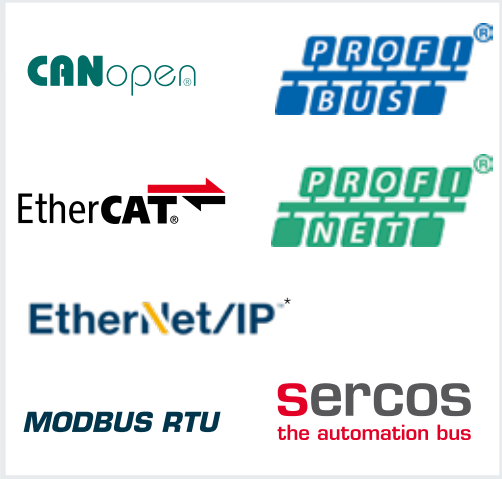


Encoderless positioning - KOSTAL ISP

When we talk about motion control, we are talking about means controlling a movement in such a way that it stops at a defined position stops. This is usually accompanied by Sensors are used that provide information about the position back to the frequency inverter. This sensor system However, it is expensive and makes the system more susceptible to Disturbances.

Thanks to the patented sensorless control process enables Kostal positioning applications completely without donor.

With the INVEOR MP and MPM you get thus a positioning function completely sensorless and supplied without any further effort on your part. We call the KOSTAL Integrated Sensorless Positioncontrol.



*from Q4/2021

Comprehensive communication interfaces

The choice of the preferred fieldbus usually depends on the controller manufacturer used in the system, the geographic region, the functional requirements in terms of speed and network spread and availability of suitable field devices. The INVEOR product family offers a large number of communication options, allowing it to be easily integrated in existing automation processes without having to depart from the fieldbus systems used previously in the application. The fieldbus systems can be selected as options.

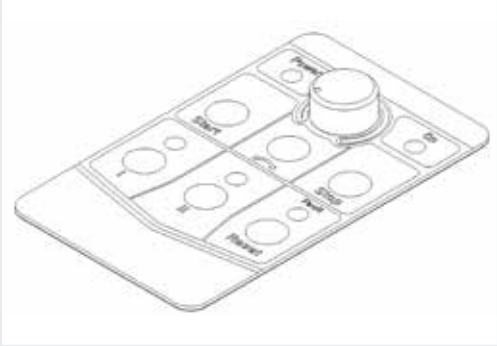
Ethernet fieldbus module

The Ethernet fieldbus module offers 4 fieldbuses on one module: PROFINET, ETHERCAT, SERCOS III AND ETHERNET IP. The module is downward compatible with all INVEOR frequency converter with Ethernet fieldbus.
The required fieldbus is simply selected by a parameter.
In this way, storage is reduced and more flexibility is achieved.

MQTT protocol

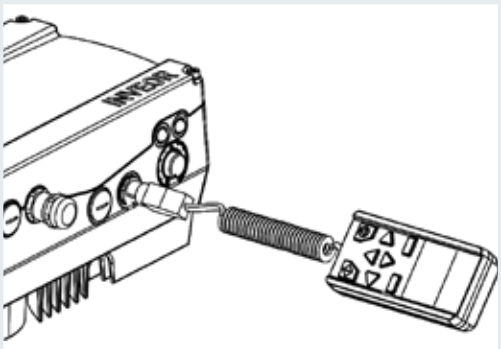
The INVEOR MP now supports the MQTT protocol for machine-to-machine communication. This means that the performance class of the KOSTAL frequency inverter is IoT-capable and ready for the requirements of Industry 4.0.

In recent years, MQTT has become the standard protocol for machine-to-machine communication between devices and applications.



Integrated foil keypad

Decentralised drive controllers are easy to access in the field and can also be operated locally thanks to the integrated foil keypad. Changes in direction of rotation, parameter changes, changes in the target value and start and stop commands are therefore possible. What‘s more, the integrated potentiometer allows target values to be specified with ease. The foil keypad can be selected as an option in the INVEOR configuration.

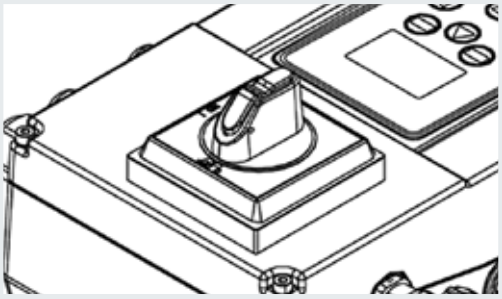


Handheld controller Man-Machine-Interface (MMI)

For commissioning, parameter adaptations and service purposes, our flexible MMI handheld controller is available as an alternative to the PC software. You can edit and save parameters and copy parameter sets from one device to another (clone devices). You can also specify target values and display actual values. The MMI handheld controller is available as an accessory to the INVEOR.

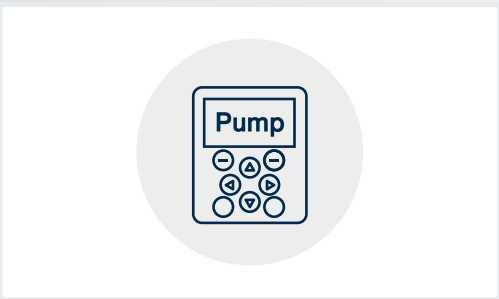
Integrated Man-Machine-Interface (MMI)

The full functionality of the handheld controller, combined with 5 freely selectable status screens, enables parameterization and operation on the drive controller itself. Everything complies with the IP device protection class. The MMI functionality can be selected as an option in the INVEOR configuration.



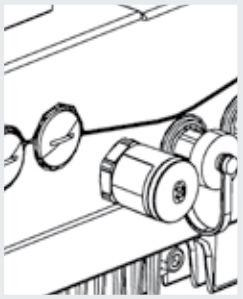
Main switch (option)

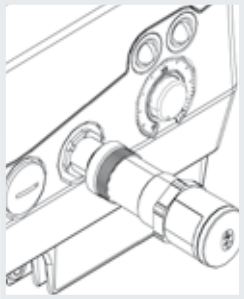
The integrated main switch allows the supply voltage to be fully disconnected.



Pump display

The pump display enables control based on pump-specific process variables. For example, pressure or pressure flow can be set directly. set.





Bluetooth / app (accessory / option)

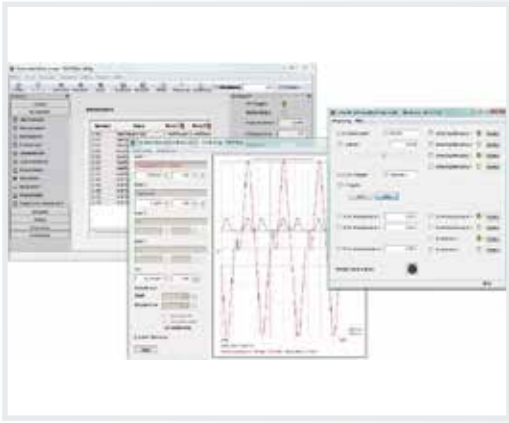
The KOSTAL INVERTERapp provides a very convenient way of commissioning and observing the application. Either an integrated or pluggable solution is available for communication with the INVEOR.

GET IT ON Google Play

Download on the App Store

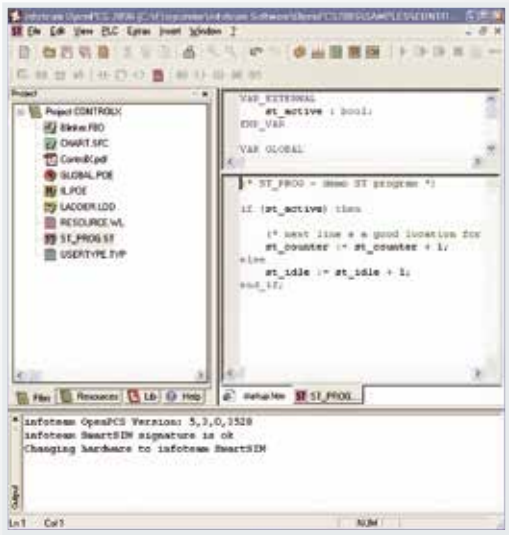
Touch operating terminal

You can conveniently automate several INVEOR drive controllers without a fieldbus using the touch operating terminal, which is available as an accessory.



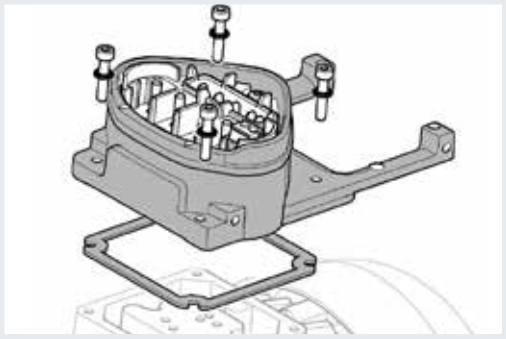
KOSTAL INVERTERpc software

The user will get to grips with intuitive PC software interface with virtually no assistance. Commissioning can be easily undertaken by oscilloscope, parameter adaptation and the cloning of drive axes. Automatic motor identification, parameter presettings and customer-specific actual value displays automate and speed up application commissioning. The INVEOR PC software is available to download for free from the following website:
https://kostal-drives-technology.com/INVERTERpc



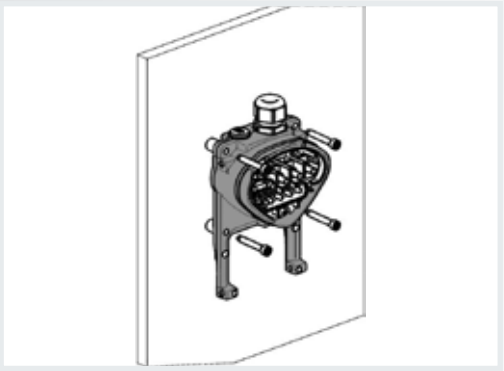
Soft PLC, IEC 61131-3

The INVEOR provides a freely programmable soft PLC solution with complete access to the device parameters and status data. Programming and depiction can take place in a function block diagram (FBD), structured text (ST) and a list of instructions (AWL). There are 20 technology parameters, which you can use for your specific functions in your application. Each INVEOR is equipped with the soft PLC solution as standard.



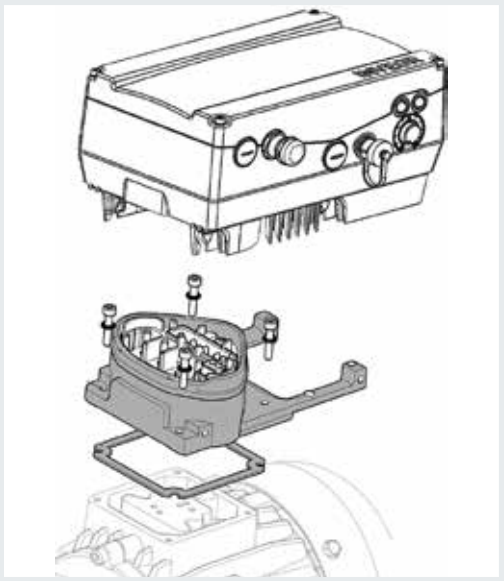
Motor adapter plate

In order to mechanically install the drive controller on the motor, the INVEOR adapter plate (ADP) is used in place of the terminal box. The INVEOR can then be attached directly to this (plug-and-play). Thanks to the large number of adapter plates available, virtually any motor can be adapted. You will find suitable adapter plates in the accessories area.



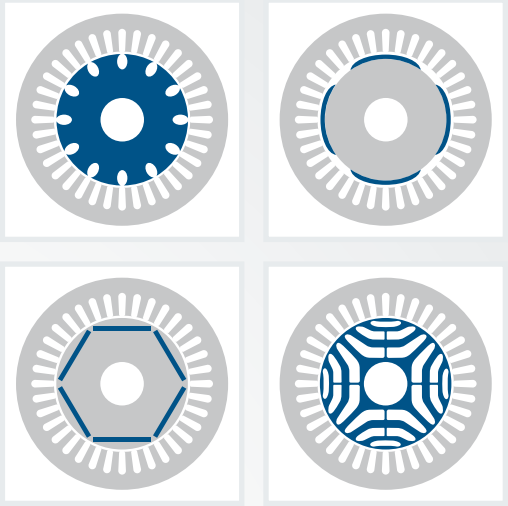
Mounting adapter plate on wall

If the application does not perwith installation on the motor, installation close to the motor is possible. As an alternative to the motor adapter plate, KOSTAL provides an adapter plate for wall mounting. You will find wall mounting plates in the accessories area.



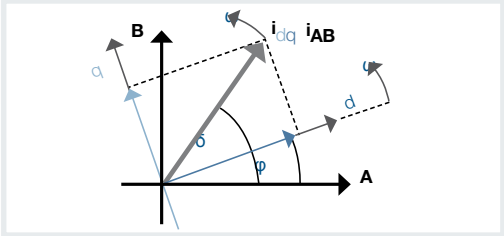
Extensive range of adapter plates

The range includes a large number of adapter plates and intermediate adapters for many common motor types. Specific adapter plates are also available for special motors and can be set up to match requirements and quantities. Please get in touch with your KOSTAL contact for more details.



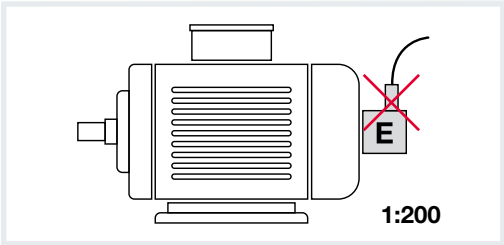
All motor types

The INVEOR supports all motor technologies from asynchronous and the various PM synchronous motors to the synchronous reluctance motor and synchronreluctance with assistant magnets.



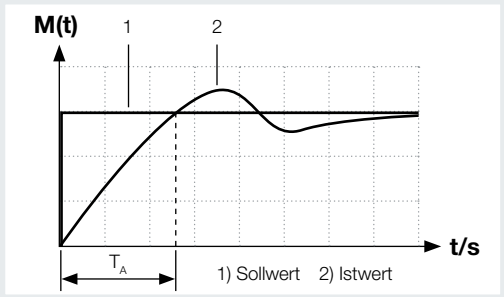
Field-oriented sensor-free control

Compared with controlled processes, such as voltage/frequency control, the INVEOR attains improved start-up torques and better efficiency. Expensive speed sensor feedback can be dispensed with.



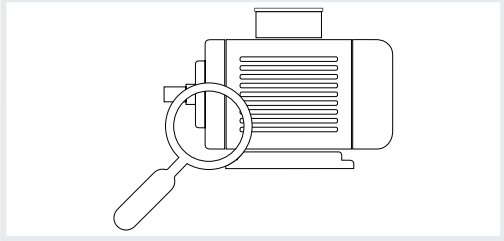
Maximum speed range (without sensors)

The innovative control technology of the INVEOR drive controller without rotary encoder feedback perwiths a speed range of 1:200. This means that even processes requiring a very high level of precision can be depicted.



Torque control

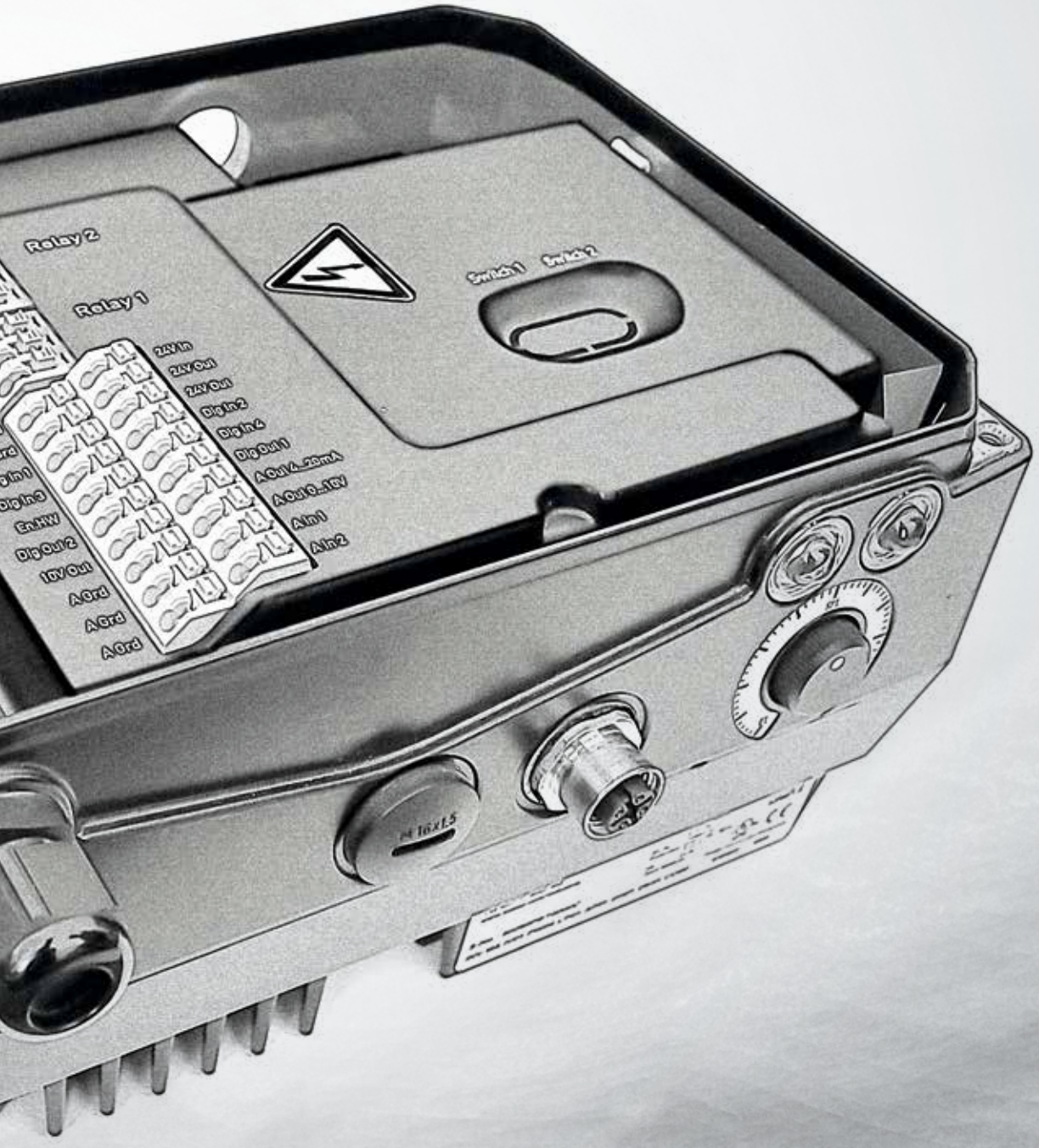
Torque control and torque liwithation perwith use in applications such as extruder worms or winding applications where constant torque is essential. The function is available in the entire speed range without additional encoder feedback.



Automatic motor identification

To speed up the process of commissioning the drive controller in combination with external motors, the INVEOR family provides automatic motor identification. Only the type plate data has to be entered to start the identification process.

INVEOR M / INVEOR P



Equipment features

Overview of INVEOR M / INVEOR P

By selecting the application PCB as part of the INVEOR configuration, you define the main functionalities and features, in particular the interfaces and fieldbus options, of your drive controller. The following overviews provide a summary of the equipment features of the individual application PCBs.

Application PCBs available per INVEOR size

Depending on size (A, B, C, D), there are up to three application PCBs: basic, standard and functional safety. There is only a standard application PCB for the α size. You can see the application PCBs available per size below.

Size	α	A, B, C	A, B, C, D	
Application circuit board model	**Standard**	**Basic**	**Standard**	**Functional safety**
Size α, 1Ph (0.25 kW – 0.75 kW)	■■			
Size A, 1Ph (0.37 kW – 1.5 kW)		■	■*	
Size A, 3Ph (0.55 kW – 1,5 kW)		■	■	■
Size B, 3Ph (2.2 kW – 4.0 kW)		■	■	■
Size C, 3Ph (5.5 kW – 7.5 kW)		■	■	■
Size D, 3Ph (11.0 kW – 22.0 kW)			■	■

* not 1.5 kW

Operation and observation

Size	α	A, B, C	A, B, C, D	
Application circuit board model	**Standard**	**Basic**	**Standard**	**Functional safety**
Soft-SPS. IEC 61131-3	■■	■■	■■	■■
KOSTAL INVERTERpc software	■■	■■	■■	■■
KOSTAL INVERTERapp	■■	■■	■■	■■
Potentiometer on device	Accessories	■	■	■
Integrated foil keypad	■			
Integrated foil keypad option with potentiometer		■	■ Cannot be combined with fieldbus option	■
Bluetooth module	■	■	■	■
Bluetooth stick	Accessories	Accessories	Accessories	Accessories
Integrated MMI		■	■	■
MMI handheld controller	Accessories	Accessories	Accessories	Accessories
Touch operating terminal	Accessories	Accessories	Accessories	Accessories

Fieldbus options

Size	α	A, B, C	A, B, C, D	
Application circuit board model	**Standard**	**Basic**	**Standard**	**Functional safety**
Modbus RTU	■■	■■	■■	■■
CANopen	■		■	■
PROFIBUS			■	■
PROFINET			■	■
EtherCAT			■	■
Sercos III			■	■
Ethernet fieldbus module (PROFINET, Sercos III)			■	■
Fieldbus address coding switch			■■ CANopen, PROFIBUS DP, Sercos III	

Housing versions and attachments

Size	α	A, B, C	A, B, C, D	
Application circuit board model	**Standard**	**Basic**	**Standard**	**Functional safety**
M12 plug for MMI, PC or Modbus	Accessories	■■	■■	■■

Functions and characteristics

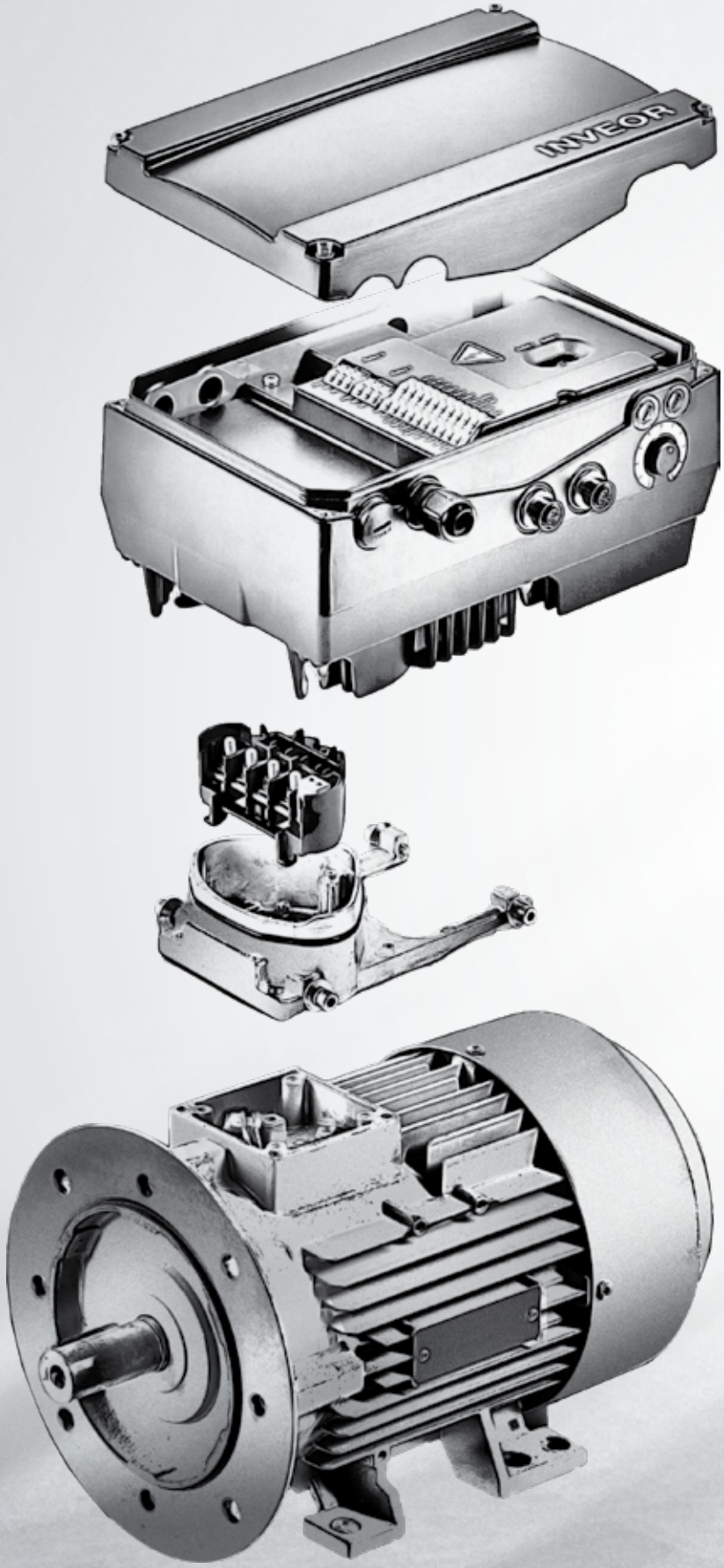
Size	α	A, B, C	A, B, C, D	
Application circuit board model	**Standard**	**Basic**	**Standard**	**Functional safety**
PID control	■■	■■	■■	■■
Digital inputs	2	2	4	4
Digital outputs	1	1	2	2
Analogue inputs*	1	1	2	2
Analogue outputs			1	1
Hardware enable, digital	■■	■■	■■	
STO inputs				2
Digital input 5, rapid stop SS1				■■
STO diagnosis relay				■■
24 V voltage supply	■■	■■	■■	■■
24 V Einspeisung für die Steuerteilkarte			■■	■■
10 V voltage supply	■■	■■	■■	■■
Relay	1		2	
Motor temperature evaluation	■■	■■	■■	■■

* can be configured as digital inputs

Power PCB card options

INVEOR sizes	α	A	B	C	D
Brake chopper		■	■	■	■
IT network	■				

INVEOR M



Order code

The INVEOR order code comprises a total of 9 individual items. Each item determines one stage of the INVEOR configuration relating to the various device characteristics.

Item	Code	
1	INV M	**INVEOR type** motor-mounted
2	x	**Size** α, A, B, C, D
3	IVxx	**Supply voltage** 230 V or 400 V
4	PWxx	**Recommended motor rating** 0.25 kW to 22 kW
5	LPxx	**Configuration of power PCB** with and without brake chopper
6	APxx	**Configuration of the application PCB** Input/output configuration, fieldbus or safety technology
7	GHxx	**Housing configuration** Cooling type, screw connections, potentiometer and attachments
8	DKxx	**Cover variant** and controls
9	COxx	**Model** Standard or special model

Here you can configure the INVEOR and enter the order code:

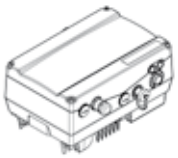
Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9

The configuration starts on **page 29**.
Please state this complete order code when ordering.

The route to your INVEOR M

The route to your INVEOR configuration is illustrated below. For each of the 9 items, you make a configuration decision, producing one part of the order code. Together all 9 sub-codes produce your total order code, clearly defining your INVEOR.

Item 1: INVEOR type



INVEOR M

Item 2: Size

0.25 kW – 0.75 kW	0.37 kW – 1.5 kW	2.2 kW – 4.0 kW	5.5 kW – 7.5 kW	11.0 kW – 22.0 kW
α	A	B	C	D

Item 3: Supply voltage

400 V

230 V

Item 4: Recommended motor rating

0.25 kW – 22.0 kW

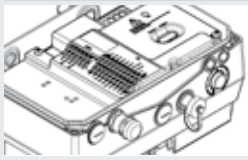
Item 5: Power PCB

Brake chopper

☐ Yes

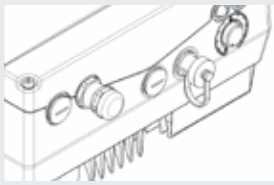
☐ No

Item 6: Application PCB



- Application PCB
- Fieldbus

Item 7: Housing configuration

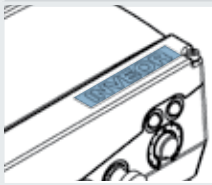


- Cable screw connections
- Cooling type

Item 8: Cover variant

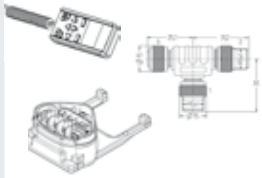
- without controls
- Foil keypad
- MMI

Item 9: Model



- KOSTAL standard
- Special model

Selection of accessories



- Motor adaptation
- Operation and observation
- Communication
- Additional accessories

Selection of accessories: Motor adaptation, operation and observation, communication, additional accessories as of **page 72**.

Configuration
INVEOR M

Item 1: INVEOR type	INV x

	**INVEOR M** **motor- and wall-mounted**	**INV M**

Item 2: Size	x

The motor rating is key to the choice of size.
Please select the power range into which your motor rating falls.

Size selection

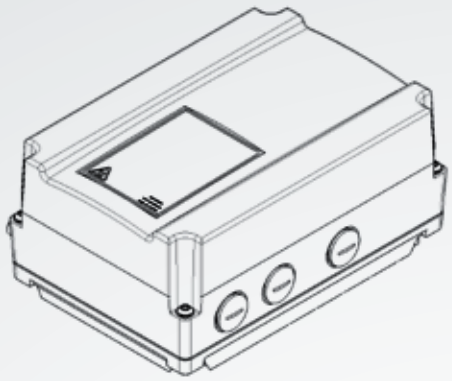
Motor rating	Size	Item number
0.25 kW – 0.75 kW →	**α** go to page 30	10111287
0.37 kW – 1.5 kW →	**A** go to page 32	10094115
2.2 kW – 4.0 kW →	**B** go to page 32	10102294
5.5 kW – 7.5 kW →	**C** go to page 32	10102295
11.0 kW – 22.0 kW →	**D** go to page 32	10102296

Other configuration are listed on the following pages.

Configuration

INVEOR M

Size α (0.25 – 0.75 kW)



Item 3: Supply voltage	IVxx
1 x 100 VAC -15%…230 VAC +10%	IV02

Item 4: Recommended motor rating			PWxx
Power class	**Nominal current [A]***	**Overload 60 sec.***	
0.25 kW	1.4	150%	PW01
0.37 kW	2.2	150%	PW02
0.55 kW	2.7	150%	PW03
0.75 kW	3.3	150%	PW04

⚠ Recommended motor rating (4-pole asynchr. motor) is given based on the 230 VAC supply voltage.
* details see data sheet

Item 5: Power PCB	LPxx
Standard	LP01
IT network	LP07

⚠ INVEOR α without brake chopper option

Item 6: Application PCB		APxx	
Variant	**Field bus**		**with**
Standard 2 DI | 1 DO | 1 AI | 1 relays		AP12	AP40
Standard 2 DI | 1 DO | 1 AI | 1 relays	CANopen	AP13	AP42

Details on **page 74/75**

Item 7: Housing configuration	GHxx
Passive cooling type for power of between 0.25 and 0.37 kW	GH11
Passive cooling type (ribbed) for power of between 0.55 and 0.75 kW	GH10

⚠ Please remember that an adapter plate is needed for each device.
Details on **page 74 / 75**

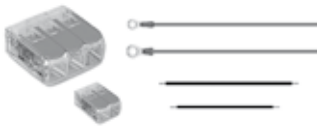
Item 8: Cover variant	DKxx
Cover without foil keypad	DK01
Cover with foil keypad	DK04

Details on **page 22**

Item 9: Model	COxx
KOSTAL Standard	CO00

⚠ For models with a customer label, please get in touch with your KOSTAL contact.

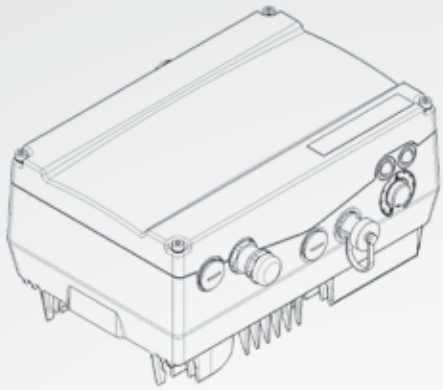
Suitable accessories

	Description	Item number
	**Cable set** Cable set for extending the motor connection (including crimp material)	10118226
	**Adapter for jack plug on M12** Adapter for jack plug on M12 for MMI/PC cable connection	10118219
	**M12 screw-in coupling MMI/ PC / Modbus/IO plug** M12 screw-in coupling on JST 4-pin, A-coded, cable length 240 mm, M16 x 1.5, including captive protec-tive ca	10118216
	**Potentiometer** Potentiometer on JST 3-pin for screwing in, cable length 180 mm, including reducer M16 x 1.5 and scale	10118232
	**M12 screw-in plug CANopen** M12 screw-in plug on JST 3-pin, for CANopen connection, A-coded, cable length 110 mm, M16 x 1.5, including captive protective cap	10118224

Configuration

INVEOR M

Size A-D (0.37 – 22 kW)



Item 3: Supply voltage		IVxx
Size	**Variant**	
A	1 x 100 VAC -15%…230 VAC +10%	IV02
A - D	3 x 200 VAC -10%…480 VAC +10%	IV01

Item 4: Recommended motor rating					PWxx
Size	**Supply voltage**	**Power Class**	**Nominal current [A]***	**Overload 60 sec.***	
A	1 x 230 VAC	0.37 kW	2.3	150%	PW02
	1 x 230 VAC	0.55 kW	3.2	150%	PW03
	3 x 400 VAC	0.55 kW	1.7	150%	PW03
	1 x 230 VAC	0.75 kW	3.9	150%	PW04
	3 x 400 VAC	0.75 kW	2.3	150%	PW04
	1 x 230 VAC	1.10 kW	5.2	150%	PW05
	3 x 400 VAC	1.10 kW	3.1	150%	PW05
	1 x 230 VAC**	1.50 kW	7.0	125%	PW90 **
	3 x 400 VAC	1.50 kW	4.0	150%	PW06
B	3 x 400 VAC	2.20 kW	5.6	150%	PW07
	3 x 400 VAC	3.00 kW	7.5	150%	PW08
	3 x 400 VAC	4.00 kW	9.5	150%	PW09
C	3 x 400 VAC	5.50 kW	13.0	150%	PW10
	3 x 400 VAC	7.50 kW	17.8	150%	PW11
D	3 x 400 VAC	11.00 kW	28.0	150%	PW12
	3 x 400 VAC	15.00 kW	34.0	150%	PW13
	3 x 400 VAC	18.50 kW	40.0	150%	PW14
	3 x 400 VAC	22.00 kW	48.0	130%	PW15

⚠ Recommended motor rating (4-pole asynchr. motor) is given based on the 230 VAC or 400 VAC supply voltage.
* details see data sheet ** only with AP03 or AP41 and LP99 and DK01

Item 5: Power PCB		LPxx	
Size	**Variant**	**without brake chopper**	**with brake chopper***
A	Basic version	LP01	LP02
	Basic version (only with PW 90)	LP99	-
B	Basic version	LP01	LP02
	Heavy duty version	-	LP54
C	Basic version	LP01	LP04
	Heavy duty version	-	LP54
D	Basic version	LP03	LP04
	Heavy duty version	LP53	LP54

* for connecting a brake resistor

Item 6: Application PCB — APxx

Size	Variant	Field bus		with
A - C	**Basic** 2 DI | 1 DO | 1 AI		AP03	AP41
A - D	**Standard** 4 DI | 2 DO | 2 AI | 1 AO | 2 relays		AP01	AP40
	Standard * 4 DI | 2 DO | 2 AI | 1 AO | 2 relays	CANopen	AP05	AP42
	Standard * 4 DI | 2 DO | 2 AI | 1 AO | 2 relays	EtherCAT	AP06	
	Standard * 4 DI | 2 DO | 2 AI | 1 AO | 2 relays	PROFIBUS	AP16	AP46
	Standard * 4 DI | 2 DO | 2 AI | 1 AO | 2 relays	PROFINET sercos the automation bus	AP17	AP47
	Functional safety ** 2 STO | 4 DI | 2 DO | 2 AI | 1 AO SIL3 PLe		AP10	AP50
	Functional safety ** 2 STO | 4 DI | 2 DO | 2 AI | 1 AO SIL3 PLe	CANopen	AP21	AP51
	Functional safety ** 2 STO | 4 DI | 2 DO | 2 AI | 1 AO SIL3 PLe	EtherCAT	AP22	
	Functional safety ** 2 STO | 4 DI | 2 DO | 2 AI | 1 AO SIL3 PLe	PROFIBUS	AP25	AP55
	Functional safety ** 2 STO | 4 DI | 2 DO | 2 AI | 1 AO SIL3 PLe	PROFINET sercos the automation bus	AP26	AP56

* not with membrane keyboard DKx2 ** only with IV01

Item 7: Housing configuration — GHxx

Size	Variant	without potentiometer	with potentiometer
A - C	Passive cooling type, standard screw connections	GH02	GH01
D	Active cooling type, standard screw connections	GH09	GH06

⚠ Please remember that an adapter plate is needed for each device. Details on **page 70 / 71**

Item 8: Cover variant — DKxx

Size	Variant	
A - D	Cover without controls	DK01
	Cover with foil keypad and potentiometer*	DK02
	Cover with integrated MMI	DK05

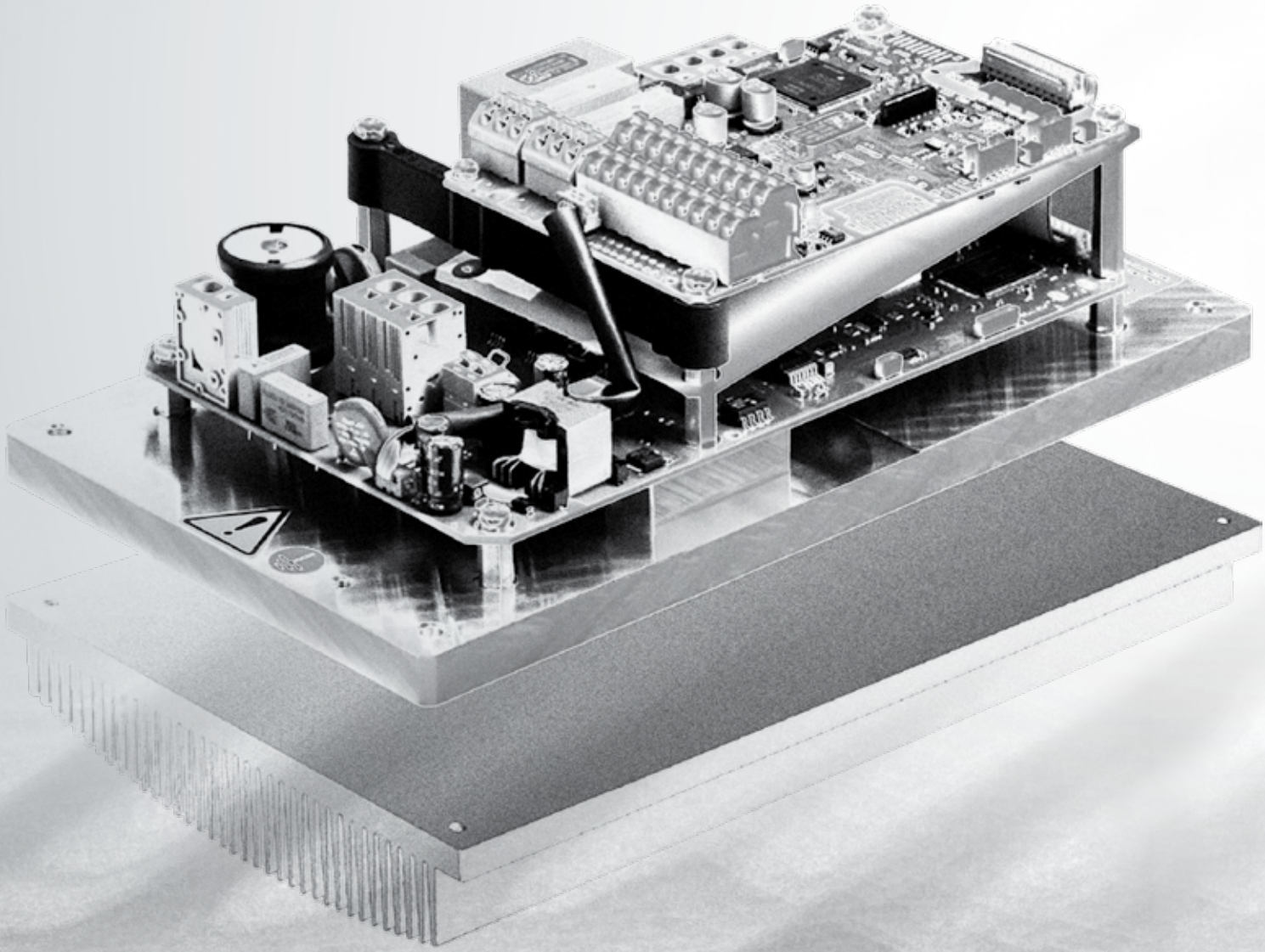
* Size A-C only with GH02, size D only with GH09. Not in combination with standard application board and fieldbus. Details on **page 24**

Item 9: Model — COxx

Size	Variant	
A - D	KOSTAL standard	CO00

⚠ For models with a customer label, please get in touch with your KOSTAL contact.

INVEOR P



Order code

The INVEOR order code comprises a total of 9 individual items. Each item determines one stage of the INVEOR configuration relating to the various device characteristics.

Item	Code	
1	INV P	**INVEOR type** cold plate
2	x	**Size** α, A, B, C, D
3	IVxx	**Supply voltage** 230 V or 400 V
4	PWxx	**Recommended motor rating** 0.25 kW to 22 kW
5	LPxx	**Configuration of power PCB** with and without brake chopper
6	APxx	**Configuration of the application PCB** Input/output configuration, fieldbus or safety technology
7	GHxx	**Housing configuration** Cooling type, screw connections, potentiometer and attachments
8	DKxx	**Cover variant** and controls
9	COxx	**Model** Standard or special model

Here you can configure the INVEOR and enter the order code:

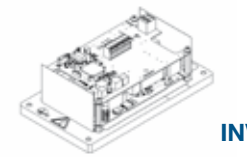
Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9

The configuration starts on **page 37.**
Please state this complete order code when ordering.

The route to your INVEOR P

The route to your INVEOR configuration is illustrated below. For each of the 9 items, you make a configuration decision, producing one part of the order code. Together all 9 sub-codes produce your total order code, clearly defining your INVEOR.

Item 1: INVEOR type



INVEOR P

Item 2: Size

0.25 kW – 0.75 kW	0.37 kW – 1.5 kW	2.2 kW – 4.0 kW	5.5 kW – 7.5 kW	11.0 kW – 22.0 kW
α	A	B	C	D

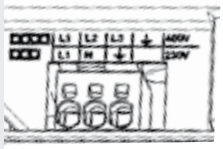
Item 3: Supply voltage

- 400 V
- 230 V

Item 4: Recommended motor rating

0.25 kW – 22.0 kW

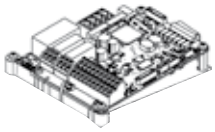
Item 5: Power PCB



Brake chopper

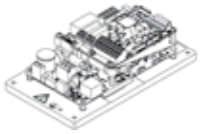
- ☐ Yes
- ☐ No

Item 6: Application PCB



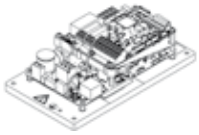
- ■ Application PCB
- ■ Field bus

Item 7: Housing configuration



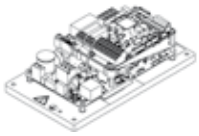
- ■ without housing

Item 8: Cover variant



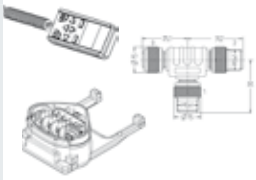
- ■ without cover

Item 9: Model



- ■ KOSTAL standard
- ■ Special model

Selection of accessories

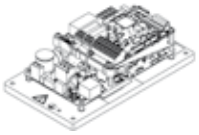


- ■ Motor adaption
- ■ Operation and observation
- ■ Communication
- ■ Additional accessories

Selection of accessories: Motor adaptation, operation and observation, communication, additional accessories as of **page 72**.

Configuration
INVEOR P

Item 1: INVEOR type	INV x

	**INVEOR P cold plate**	**INV P**

Item 2: Size	x

The motor rating is key to the choice of size.
Please select the power range into which your motor rating falls.

Size selection

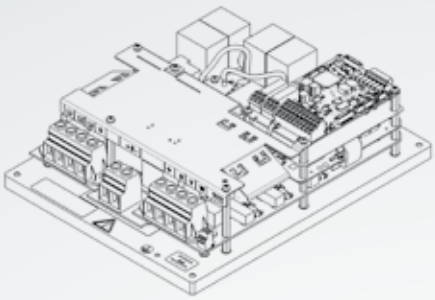
Motor rating	Size	Item number
0.25 kW – 0.75 kW →	**α**	10135174
0.37 kW – 1.5 kW →	**A**	10135189
2.2 kW – 4.0 kW →	**B**	10135173
5.5 kW – 7.5 kW →	**C**	10135191
11.0 kW – 22.0 kW →	**D**	10135192

Other configuration points are listed on the following pages.

Configuration

INVEOR P

Size α-D (0.25 – 22 kW)



Item 3: Supply voltage		IVxx
Size	**Variant**	
α - A	1 x 100 VAC -15%…230 VAC +10%	**IV02**
A - D	3 x 200 VAC -10%…480 VAC +10%	**IV01**

Item 4: Recommended motor rating				PWxx
Size	**Supply voltage**	**Power class**	**Nominal current [A]***	**Overload 60 sec.***	
α	1 x 230 VAC	0.75 kW	3.3	150%	**PW04**
A	1 x 230 VAC	1.10 kW	5.2	150%	**PW05**
	3 x 400 VAC	1.50 kW	4.0	150%	**PW06**
B	3 x 400 VAC	4.00 kW	9.5	150%	**PW09**
C	3 x 400 VAC	7.50 kW	17.8	150%	**PW11**
D	3 x 400 VAC	15.00 kW	34.0	150%	**PW13**
	3 x 400 VAC	22.00 kW	48.0	130%	**PW15**

⚠ Recommended motor rating (4-pole asynchr. motor) is given based on the 230 VAC supply voltage.

* details see data sheet

Item 5: Power PCB		LPxx	
Size	**Variant**	**without brake chopper**	**with brake chopper***
α	Basic version	**LP01**	-
	Basic version IT network	**LP07**	-
A	Basic version	**LP01**	**LP02**
B	Basic version	**LP01**	**LP02**
C	Basic version	**LP01**	**LP04**
D	Basic version	**LP03**	**LP04**

* for connecting a brake resistor

Item 6: Application PCB — APxx

Size	Variant	Field bus	
α	**Standard** 2 DI | 1 DO | 1 AI | 1 relays		AP12
	Standard 2 DI | 1 DO | 1 AI | 1 relays	CANopen	AP13
A - C	**Basic** 2 DI | 1 DO | 1 AI		AP03
A - D	**Standard** 4 DI | 2 DO | 2 AI | 1 AO | 2 relays		AP01
	Standard * 4 DI | 2 DO | 2 AI | 1 AO | 2 relays	CANopen	AP05
	Standard * 4 DI | 2 DO | 2 AI | 1 AO | 2 relays	EtherCAT	AP06
	Standard * 4 DI | 2 DO | 2 AI | 1 AO | 2 relays	PROFIBUS	AP16
	Standard * 4 DI | 2 DO | 2 AI | 1 AO | 2 relays	PROFINET sercos the automation bus	AP17

* not with membrane keyboard DKx2

Item 7: Housing configuration — GHxx

Size	Variant	
α - D	Cold plate cooling type in IP00	GH03

Item 8: Cover variant — DKxx

Size	Variant	
α - D	without cover	DK03

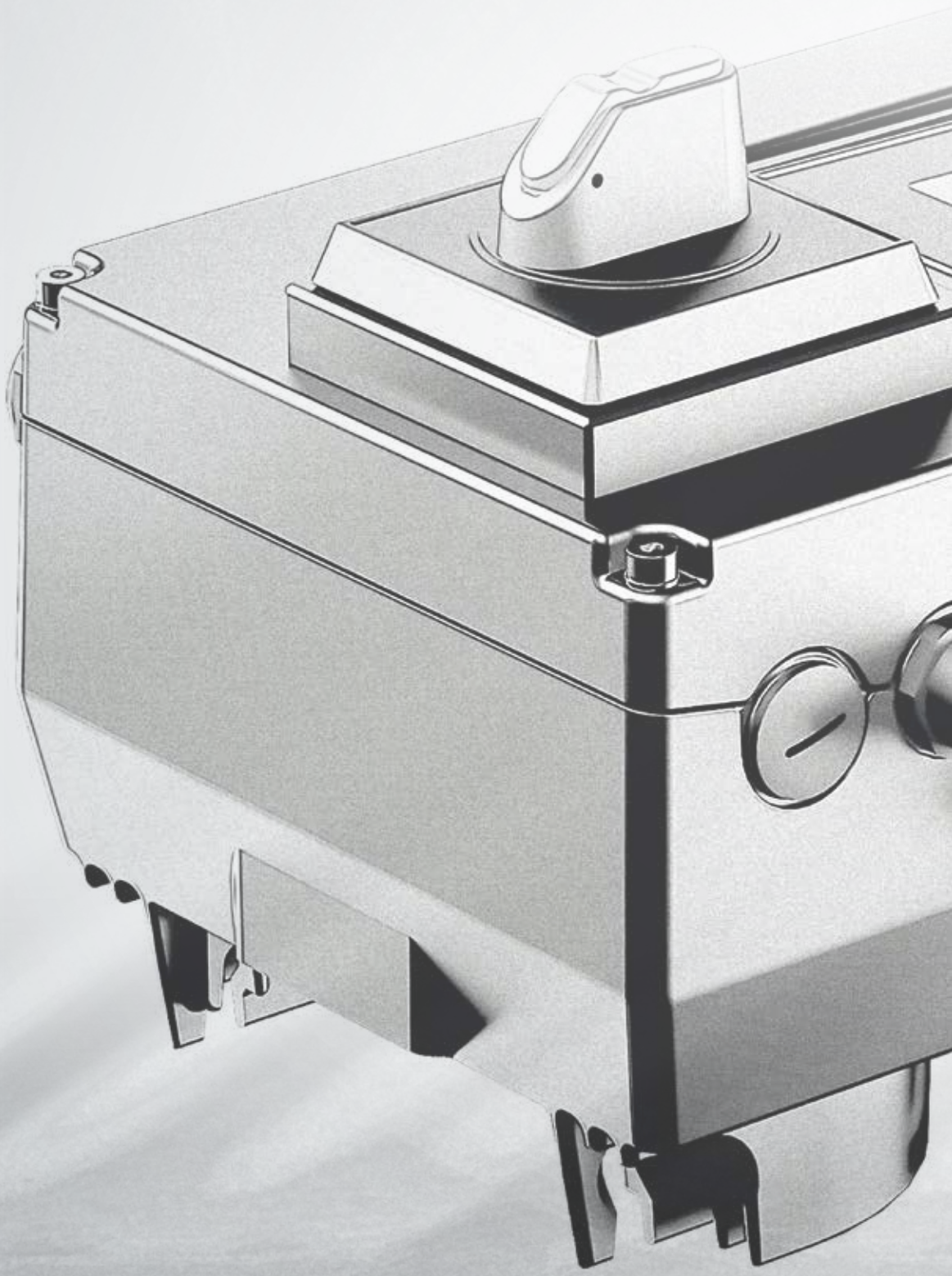
Item 9: Model — COxx

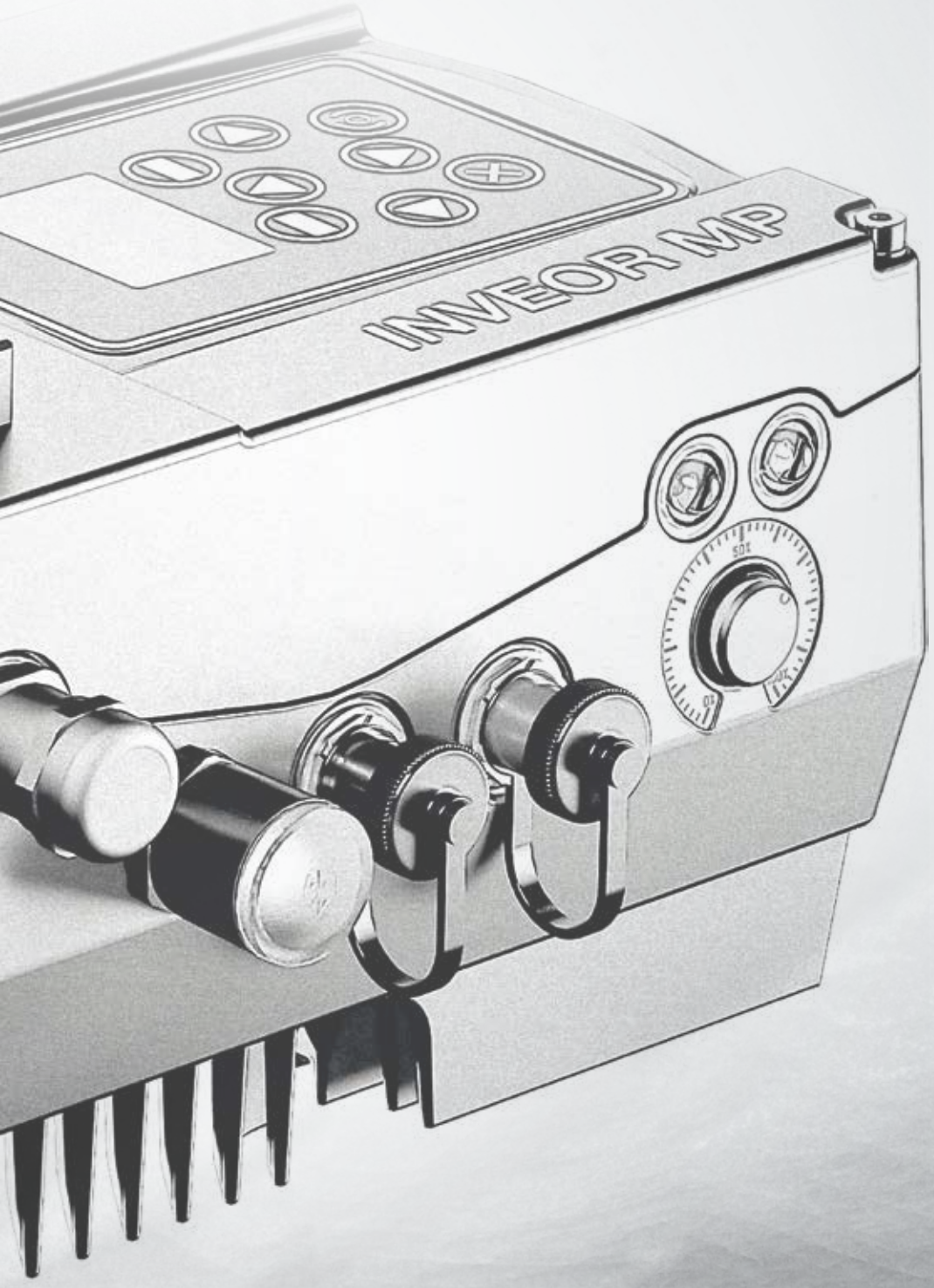
Size	Variant	
α - D	KOSTAL standard	CO00

For models with a customer label, please get in touch with your KOSTAL contact.

Accessoires for INVEOR P can be found on page 72.

INVEOR MP





Equipment features
at a glance for INVEOR MP

By selecting the application PCB as part of the INVEOR configuration, you define the main functionalities and features, in particular the interfaces and fieldbus options, of your drive controller. The following overviews provide a summary of the equipment features of the individual application PCBs.

Application PCBs available per INVEOR size

Depending on size (A, B, C or D), there are three application PCBs: basic, standard and functional safety. You can see the application PCBs available per size below.

Application circuit board model	Basic	Standard	Functional safety
Size A, 3Ph (0.55 kW – 2.2 kW)	■	■	■
Size B, 3Ph (2.2 kW – 5.5 kW)	■	■	■
Size C, 3Ph (5.5 – 11 kW)		■	■
Size D, 3Ph (11 kW – 30 kW)		■	■

Operation and observation

Application circuit board model	Basic	Standard	Functional safety
Soft PLC. IEC 61131-3	■■	■■	■■
KOSTAL INVERTERpc software	■■	■■	■■
KOSTAL INVERTERapp	■■	■■	■■
Potentiometer on device	■	■	■
Integrated foil keypad option with potentiometer	■	■ Cannot be combined with fieldbus option	■
Bluetooth module	■	■	■
Bluetooth stick	Accessories	Accessories	Accessories
Integrated MMI	■	■	■
MMI handheld controller	Accessories	Accessories	Accessories
Touch operating terminal	Accessories	Accessories	Accessories
Main switch	■	■	■
Brake module (brake rectifier)	■	■	■

* only size A + B

Fieldbus options

Application circuit board model	Basic	Standard	Functional safety
Modbus RTU	■■	■■	■■
CANopen		■	■
PROFIBUS		■	■

■■ present as standard ■ option available

Application circuit board model	Basic	Standard	Functional safety
PROFINET		■	■
EtherCAT		■	■
Ethernet fieldbus module (PROFINET, Sercos III)		■	■
Fieldbus address coding switch		■■ CANopen, PROFIBUS DP, Sercos III	

Functions and characteristics

Application circuit board model	Basic	Standard	Functional safety
PID control	■■	■■	■■
Torque control*		■■	■■
Digital inputs	2	4	4
Digital outputs	1	2	2
Analogue inputs**	1	2	2
Analogue outputs		1	1
Hardware enable, digital	■■	■■	
STO inputs			2
Digital input 5, rapid stop SS1			■■
STO diagnosis relay			■■
24 V voltage supply	■■	■■	■■
24 V feed-in for the control part card		■■	■■
10 V voltage supply	■■	■■	■■
Relay		2	
Motor temperature evaluation	■■	■■	■■

* only possible with CANopen fieldbus
** can be configured as digital inputs

Housing configurationen und Anbauteile

INVEOR sizes	A	B	C	D
M12 plug for RS485 (für MMI, Modbus or PC)	■■	■■	■■	■■
Harting plug (Han Q4/2)	■	■		
Phoenix Quickon	■	■	■	
Internal brake resistor	■	■	■	■

Power PCB card options

INVEOR sizes	A	B	C	D
Brake chopper	■	■	■	■

■■ present as standard ■ option available

INVEOR MP

Order code

The INVEOR MP order code comprises a total of 11 individual items. Each item determines one stage of the INVEOR MP configuration relating to the various device characteristics.

Item	Code	
1	INV MP	**INVEOR type** Inverter, motor-integrated, performance
2	X	**Size** A, B, C, D
3	VSxx	**Version** Performance
4	IVxx	**Supply voltage** 400 V
5	PWxx	**Recommended motor rating** 0.55 kW to 30 kW
6	LPxx	**Configuration of power PCB** with and without brake chopper
7	APxx	**Configuration of the application PCB** Input/output configuration, fieldbus or safety technology, Bluetooth
8	GHxx	**Housing configuration** Cooling type, screw connections, potentiometer and attachments, plug
9	DKxx	**Cover variant** and controls
10	OAxx	**Option module** Brake module, main switch
11	COxx	**Model** Standard or special model

Here you can configure the INVEOR and enter the order code:

Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11

The configuration starts on **page 47**.
Please state this complete order code when ordering.

The route to your INVEOR MP

The route to your INVEOR MP configuration is illustrated below. For each of the 11 items, you make a configuration decision, producing one part of the order code. Together all 11 sub-codes produce your total order code, clearly defining your INVEOR MP.

Item 1: INVEOR type

INVEOR MP

Item 2: Size

0.55 kW – 2.2 kW	2.2 kW – 5.5 kW	5.5 kW – 11 kW	11 kW – 30 kW
A	B	C	D

Item 3: Version

INVEOR MP

Item 4: Supply voltage

400 V

Item 5: Recommended motor rating

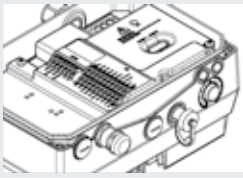
0.55 kW – 30 kW

Item 6: Power PCB

Brake chopper

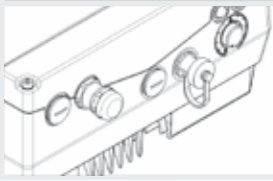
- ☐ Yes
- ☐ No

Item 7: Application PCB



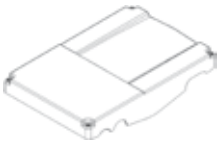
- Application PCB
- Field bus

Item 8: Housing configuration



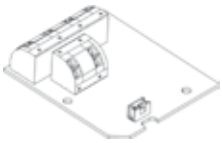
- Cable screw connections
- Cooling type
- Plug

Item 9: Cover variant



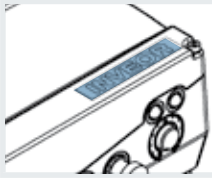
- without controls
- Foil keypad
- MMI
- Main switch

Item 10: Option module



- Main switch
- Brake module

Item 11: Model



Selection of accessories: Motor adaptation, operation and observation, communication, additional accessories as of **page 72.**

Configuration
INVEOR MP

Item 1: INVEOR type	INV x

	**INVEOR MP** **motor- and wall-mounted**	**INV MP**

Item 2: Size	x

The motor rating is key to the choice of size.
Please select the power range into which your motor rating falls.

Size selection

Motor rating	Size	Item number
0.55 kW – 2.2 kW →	**A**	10352047
2.2 kW – 5.5 kW →	**B**	10352048
5.5 kW – 11 kW →	**C**	10352049
11 kW – 30 kW →	**D**	10352060

Item 3: Version	VSxx

Performance	**VS01**

Item 4: Supply voltage	IVxx

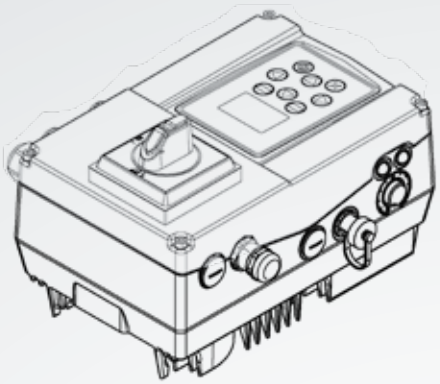
400 V	**IV01**

Other configuration points are listed on the following pages.

Configuration

INVEOR MP

Size A-D (0.55 – 30 kW)



Item 5: Recommended motor rating					PWxx
Size	**Power Class**	**Nominal current [A]***	**Overload 60 sec.***	**Overload 3 sec.***	
A	0.55 kW	1.7	150%	200%	**PW03**
	0.75 kW	2.3	150%	200%	**PW04**
	1.10 kW	3.1	150%	200%	**PW05**
	1.50 kW	4.0	150%	200%	**PW06**
	2.20 kW LD*	4.8	110%	150%	**PW46**
B	2.20 kW	5.6	150%	200%	**PW07**
	3.00 kW	7.5	150%	200%	**PW08**
	4.00 kW	9.5	150%	200%	**PW09**
	5.50 kW LD*	11.0	110%	150%	**PW49**
C	5.50 kW	13.0	150%	200%	**PW10**
	7.50 kW	16.5	150%	200%	**PW11**
	11.00 kW LD*	22.0	110%	150%	**PW51**
D	11.00 kW	28.0	150%	200%	**PW12**
	15.00 kW	34.0	150%	200%	**PW13**
	18.50 kW	40.0	150%	200%	**PW14**
	22.00 kW	46.0	150%	200%	**PW15**
	30.00 kW LD*	60.0	110%	150%	**PW55**

⚠ Recommended motor rating (4-pole asynchr. motor) is given based on the 400 VAC supply voltage.
* LD = Low Duty, details see data sheet

Item 6: Power PCB	LPxx
without brake chopper	**LP01**
with brake chopper (for connecting a brake resistor)	**LP02**

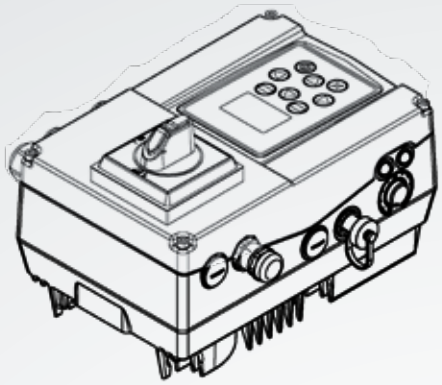
Item 7: Application PCB			APxx	
Size	**Variant**	**Field bus**		**with**
A - B	**Basic** 2 DI | 1 DO | 1 AI		**AP03**	**AP41**
A - D	**Standard** 4 DI | 2 DO | 2 AI | 1 AO | 2 relays		**AP01**	**AP40**
	Standard * 4 DI | 2 DO | 2 AI | 1 AO | 2 relays	CANopen	**AP05**	**AP42**
	Standard * 4 DI | 2 DO | 2 AI | 1 AO | 2 relays	PROFIBUS	**AP16**	**AP46**
	Standard * 4 DI | 2 DO | 2 AI | 1 AO | 2 relays	PROFINET, sercos the automation bus, EtherCAT, EtherNet/IP	**AP17**	**AP47**
	Functional safety 2 STO | 4 DI | 2 DO | 2 AI | 1 AO SIL3 PLe FUNCTIONAL SAFETY		**AP10**	**AP50**
	Functional safety 2 STO | 4 DI | 2 DO | 2 AI | 1 AO SIL3 PLe FUNCTIONAL SAFETY	CANopen	**AP21**	**AP51**
	Functional safety 2 STO | 4 DI | 2 DO | 2 AI | 1 AO SIL3 PLe FUNCTIONAL SAFETY	PROFIBUS	**AP25**	**AP55**
	Functional safety 2 STO | 4 DI | 2 DO | 2 AI | 1 AO SIL3 PLe FUNCTIONAL SAFETY	PROFINET, sercos the automation bus, EtherCAT, EtherNet/IP	**AP26**	**AP56**

* not with membrane keyboard DKx2

Konfiguration

INVEOR MP

Baugröße A-D (0,55 – 30 kW)



Item 8: Housing configuration		GHxx	
Size	**Variant**	**without potentiometer**	**with potentiometer****
A - C	Passive cooling type	**GH02**	**GH01**
	Passive cooling type, Quickon	**GH43**	**GH42**
	Passive cooling type, brake resistor*	**GH45**	**GH44**
	Passive cooling type, brake resistor*, Quickon	**GH49**	**GH48**
A - B	Passive cooling type, Harting	**GH41**	**GH40**
	Passive cooling type, brake resistor*, Harting	**GH47**	**GH46**
C	Active cooling type, brake resistor*	**GH62**	**GH61**
C - D	Active cooling type	**GH09**	**GH06**

⚠ Please remember that an adapter plate is needed for each device. Details on **page 74 / 75.**

* only with LP02

** not with DKx2

Item 9: Cover variant		DKxx	
Size	**Variant**	**without main switch**	**with main switch****
A - D	Cover without controls	**DK01**	**DK11**
	Cover with integrated MMI	**DK05**	**DK15**
A - B	Cover with foil keypad and potentiometer*	**DK02**	**DK12**

* Only in combination with a housing configuration without a potentiometer. Not in combination with standard application board and fieldbus. Details on **page 42**

** only with OA1x

Item 10: Option module	OAxx
no option module	OA00
Main switch (only with DK1X)	OA10
Brake module (brake rectifier)	OA30

Item 11: Model	COxx
KOSTAL standard	CO00

⚠ For models with a customer label, please get in touch with your KOSTAL contact.

INVEOR MPP

Equipment features
at a glance for INVEOR MPP

The INVEOR MP Pump is equipped with many pump-specific functions. With the selection of an IO extension, the unit becomes even more flexible.

Operation and observation

	Availability
Soft-SPS. IEC 61131-3	■■
KOSTAL INVERTERpc Software	■■
KOSTAL INVERTERapp	■■
Potentiometer on device	■■
Integrated foli keypad with potentiometer*	■
Bluetooth module	■
Bluetooth stick	Zubehör
Integriertes MMI	■
MMI handheld controller	Zubehör
Touch operating terminal	Zubehör
Main switch (nur BG B-D)	■

* only sizes A+B

Variant IO-extension	Standard (AP 70)	For CANopen (AP 71)
Modbus RTU	■■	■■
CANopen		■
Ethernet fieldbus (Profinet/Sercos III, Ethercat, Ethernet IP)	■	

■■ present as standard ■ option available

Functions and characteristics

The possible functions and characteristics are shown below depending on the IO module selected.

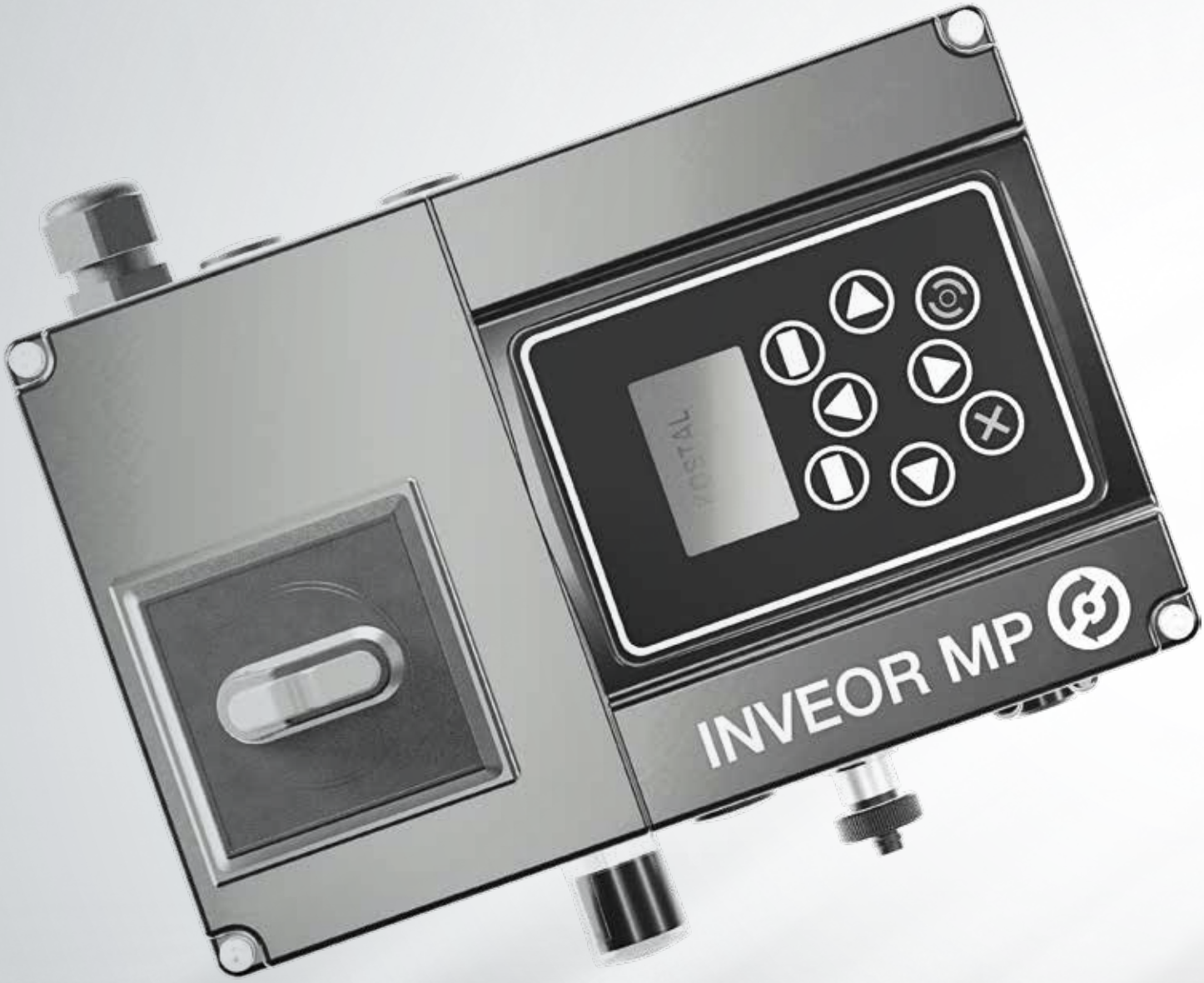
	Availability
PID Regelung	■■
Digital inputs	4
Digital outputs	1
Digital I/O (bidirectional)	2
Analogue inputs	2
Analogue I/O (bidirectional)	1
STO inputs	1
24 V power supply	■■
24 V supply for the control section card	■■
10 V Power supply	■■
Relay	2
Motor temperature evaluation	■■
Multi-pump operation	■■
Pump display	■■
PT1000 temperature sensor	■■
Smart sensor	■■
Brake chopper	■
Brake resistor	■

Housing versions and attachments

Variant IO-extension	Standard (AP 70)	For CANopen (AP 71)
M12 plug for MMI, PC or Modbus	■■	■■
M12 plug for CANopen		■■
Phoenix Quickon (Size A-C)	■	■
Internal brake resistor	■	■

■■ present as standard ■ option available

INVEOR MPP



Order code

The INVEOR MPP order code comprises a total of 12 individual items. Each item determines one stage of the INVEOR MPP configuration relating to the various device characteristics.

Item	Code	
1	INV MP	**INVEOR type** Inverter, motor-integrated, Performance
2	x	**Size** A, B, C, D
3	VSxx	**Version** MPP
4	IVxx	**Supply voltage** 400 V
5	PWxx	**Recommended motor rating** 0.55 kW to 30 kW
6	LPxx	**Power PCB** with and without brake chopper
7	APxx	**IO extension**
8	GHxx	**Housing configuration** Cooling type, screw connections, potentiometer and attachments, plug
9	DKxx	**Cover variant** and controls
10	OAxx	**Option module** Main switch
11	IOxx	**IO module** Input/output configuration, Bluetooth, Field bus
12	COxx	**Model** Standard or special model

Here you can configure the INVEOR and enter the order code:

Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12

The configuration starts on **page 59**.
Please state this complete order code when ordering.

The route to your INVEOR MPP

The route to your INVEOR MPP configuration is illustrated below. For each of the 12 items, you make a configuration decision, producing one part of the order code. Together all 12 sub-codes produce your total order code, clearly defining your INVEOR MPP.

Item 1: INVEOR type

INVEOR MPP

Item 2: Size

0.55 kW – 2.2 kW	2.2 kW – 5.5 kW	5.5 kW – 11 kW	11 kW – 30 kW
A	B	C	D

Item 3: Version

INVEOR MP

Item 4: Supply voltage

400 V

Item 5: Recommended motor rating

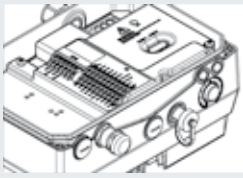
0.55 kW – 30 kW

Item 6: Power PCB

Brake chopper

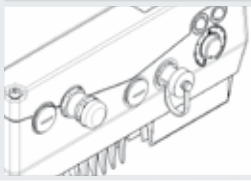
- ☐ Yes
- ☐ No

Item 7: IO extension



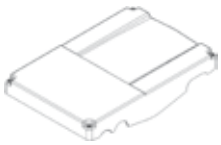
- ☐ standard
- ☐ CANopen ready

Item 8: Housing configuration



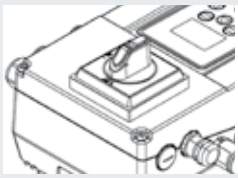
- ■ Cable screw connections
- ■ Cooling type
- ■ Plug

Item 9: Cover variant



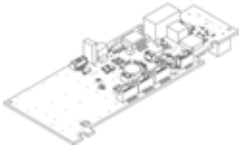
- ■ without controls
- ■ MMI
- ■ Main switch

Item 10: Option module



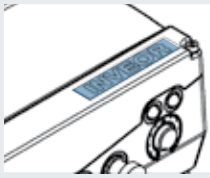
- ■ Main switch

Item 11: IO module



- ■ Field bus
- ■ Functional safety

Item 12: Model



A Selection of accessories: Motor adaptation, operation and observation, communication, additional accessories as of **page 72**

Configuration
INVEOR MPP

Item 1: INVEOR type	INV x

	**INVEOR MPP** **motor- and wall-mounted**	**INV MPP**

Item 2: Size	x

The motor rating is key to the choice of size.
Please select the power range into which your motor rating falls.

Size selection

Motor rating	Size	Item number
0,55 kW – 2,2 kW →	**A**	12185010
2,2 kW – 5,5 kW →	**B**	12185011
5,5 kW – 11 kW →	**C**	12185012
11 kW – 30 kW →	**D**	12185013

Item 3: Version	VSxx

MPP	**VS03**

Item 4: Supply voltage	IVxx

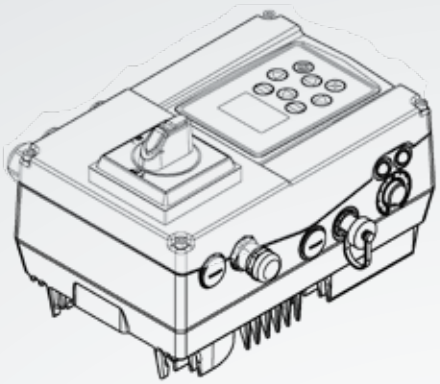
400 V	**IV01**

Other configuration points are listed on the following pages.

Configuration

INVEOR MPP

Size A-D (0.55 – 30 kW)



Item 5: Recommended motor rating					PWxx
Size	**Power Class**	**Nominal current [A]***	**Overload 60 sec.***	**Overload 3 sec.***	
A	0,55 kW	1,7	150%	200%	**PW03**
	0,75 kW	2,3	150%	200%	**PW04**
	1,10 kW	3,1	150%	200%	**PW05**
	1,50 kW	4,0	150%	200%	**PW06**
	2,20 kW LD*	4,8	110%	150%	**PW46**
B	2,20 kW	5,6	150%	200%	**PW07**
	3,00 kW	7,5	150%	200%	**PW08**
	4,00 kW	9,5	150%	200%	**PW09**
	5,50 kW LD*	11,0	110%	150%	**PW49**
C	5,50 kW	13,0	150%	200%	**PW10**
	7,50 kW	16,5	150%	200%	**PW11**
	11,0 kW LD*	22,0	110%	150%	**PW51**
D	11,0 kW	28,0	150%	200%	**PW12**
	15,0 kW	34,0	150%	200%	**PW13**
	18,5 kW	40,0	150%	200%	**PW14**
	22,0 kW	46,0	150%	200%	**PW15**
	30,0 kW LD*	60,0	110%	150%	**PW55**

⚠ Recommended motor rating (4-pole asynchr. motor) is given based on the 400 VAC supply voltage.
* LD = Low Duty, Details see data sheet

Item 6: Power PCB	LPxx
without brake chopper	**LP01**
with brake chopper (for connecting a brake resistor)	**LP02**

Item 7: IO extension	Fieldbus	APxx
Standard - 4 DI | 1 DO | 2 DIO | 2 AI | 1 AIO | 2 Relay*		**AP70**
prepared for CANopen - 4 DI | 1 DO | 2 DIO | 2 AI | 1 AIO | 2 Relay**	CANopen	**AP71**

* Possible IO modules: all
** Possible IO modules: IO03, IO04, IO13, IO14

Item 8: Housing configuration — GHxx

Size	Variant	with potentiometer in the lid**	with potentiometer in housing
A - B	Passive cooling type	GH02	GH01
	Passive cooling type, Quickon	GH43	GH42
	Passive cooling type, brake resistor*	GH45	GH44
	Passive cooling type, brake resistor*, Quickon	GH49	GH48
C	Passive cooling type	–	GH01
	Passive cooling type, Quickon	–	GH42
	Passive cooling type, brake resistor*	–	GH44
	Passive cooling type, brake resistor*, Quickon	–	GH48
	Active cooling type, brake resistor*	–	GH61
C - D	Active cooling type	–	GH06

* only with LP02
** only in combination with DK02 and DK12
⚠ Please remember that an adapter plate is needed for each device. Details on **page 74 / 75**

Item 9: Cover variant — DKxx

A - B	Cover with foil keypad and potentiometer*	DK02
B	Cover with main switch, foil keypad and potentiometer*	DK12
A - D	Cover without controls	DK01
	Cover with integrated MMI	DK05
B - D	Cover with main switch (only with OA1X)	DK11
	Cover with main switch, MMI (only with OA1X)	DK15

* only in combination with a housing configuration without a potentiometer

Item 10: Option module — OAxx

no option module	OA00
Main switch (only with DK1X)	OA10

Item 11: IO module — IOxx

Variant	Fieldbus		with
IO module 1 with M12 MMI plug		IO03	IO04
IO module 1 with M12 MMI plug 1 M12 STO		IO13	IO14
IO module 1 with M12 MMI plug*	PROFINET	IO23	IO24
IO module 1 with M12 MMI plug* 1 M12 STO	EtherNet/IP EtherCAT	IO33	IO34

* Not with AP71

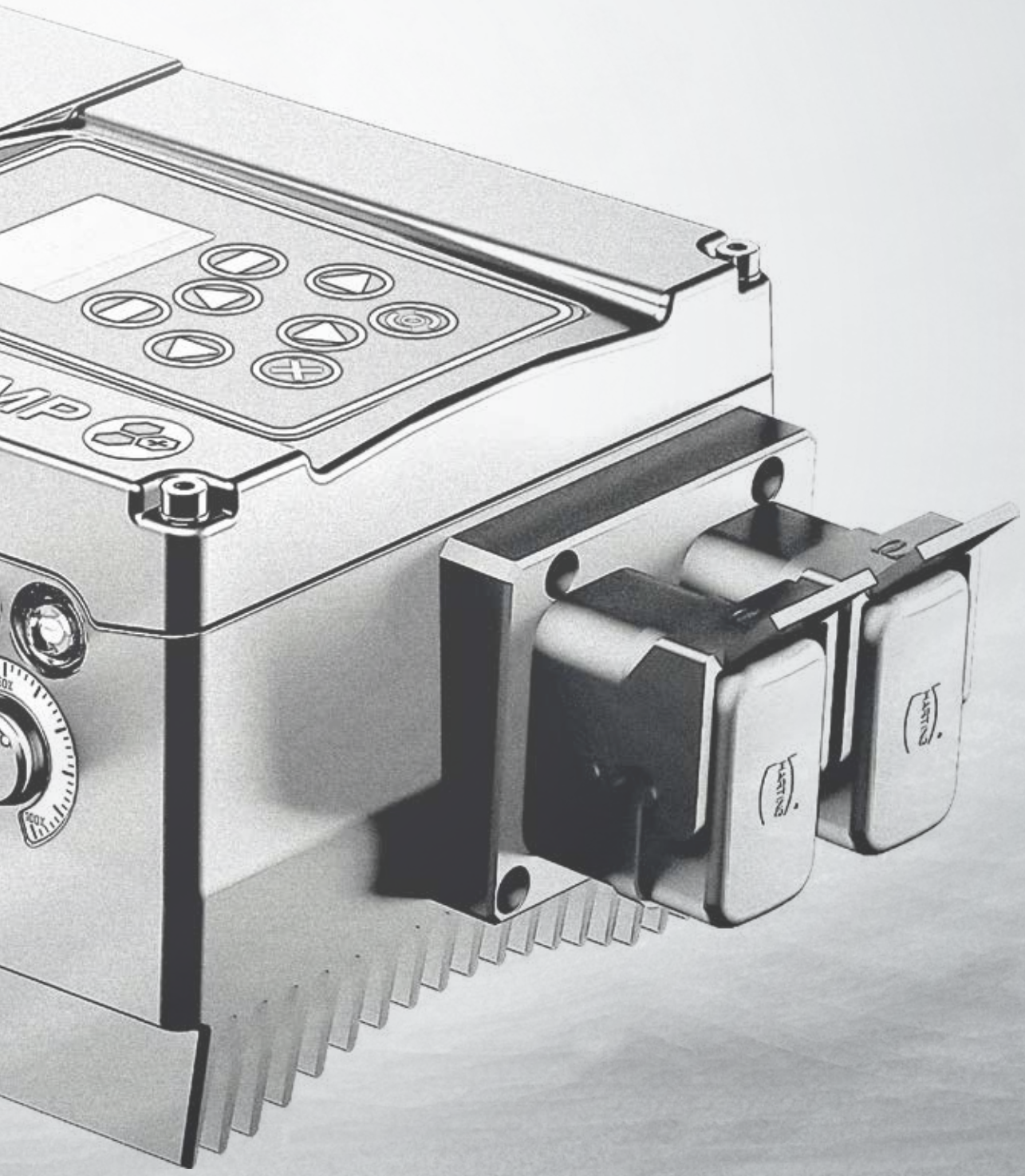
Item 12: Model — COxx

Selection of standard or special model

KOSTAL standard	CO00

⚠ For models with a customer label, please get in touch with your KOSTAL contact.

INVEOR MPM



Equipment features
at a glance for INVEOR MPM

The INVEOR MPM is equipped with a smart power stack, which reproduces key functions without additional equipment.
By selecting an IO module, the device can be fitted with further options.

Application PCBs available per INVEOR size

For sizes A and B, there are optional IO modules available which open up additional equipment options. You will find these options in the following tables.

Size	without IO module	with IO module 1
Size A, 3Ph (0.55 kW – 2.2 kW)	■	■
Size B, 3Ph (2.2 kW – 5.5 kW)	■	■
Size C, 3Ph (5.5 kW – 11 kW)	■	■
Size D, 3Ph (11 kW – 30 kW)	■	■

Operation and observation

Model IO module	without IO module	with IO module 1
KOSTAL INVERTERpc software	■■	■■
KOSTAL INVERTERapp		■■
Potentiometer on device		■
Bluetooth module		■
Bluetooth stick		■
Integrated MMI		■
MMI handheld controller		■
Touch operating terminal		Accessories
Main switch		■
Brake module (brake rectifier)		■

Fieldbus options

Without an IO module, either Modbus RTU or CANopen is available. With an IO module, more fieldbuses are available.

Variant	without IO module	with IO module 1
Modbus RTU / CANopen*	■■	■■
Modbus RTU		■
Ethernet fieldbus (Profinet / EthernetIP / EtherCAT)	■	■

* optional and only with separate plug from the accessories

■■ present as standard ■ option available

Functions and characteristics

The possible functions and characteristics are shown below depending on the IO module selected.

Variant	without IO module	with IO module 1
Digital inputs		3
Digital outputs		1
24 V voltage supply		■■
24 V supply for the IO module *		■
STO input		■
STO diagnosis relay		■
Motor temperature evaluation	■■	■■

* only with STO or fieldbu

Housing versions and attachments

Variant	without IO module	with IO module 1
M12 plug for MMI, PC or Modbus	■■	■■
M12 plug for CANopen	Accessories	■■*
M12 IO plug (2 Items)*		■
Harting plug (Han Q4/2, Size A-B)	■	■
Phoenix Quickon (Size A-C)	■	■
Internal brake resistor	■	■

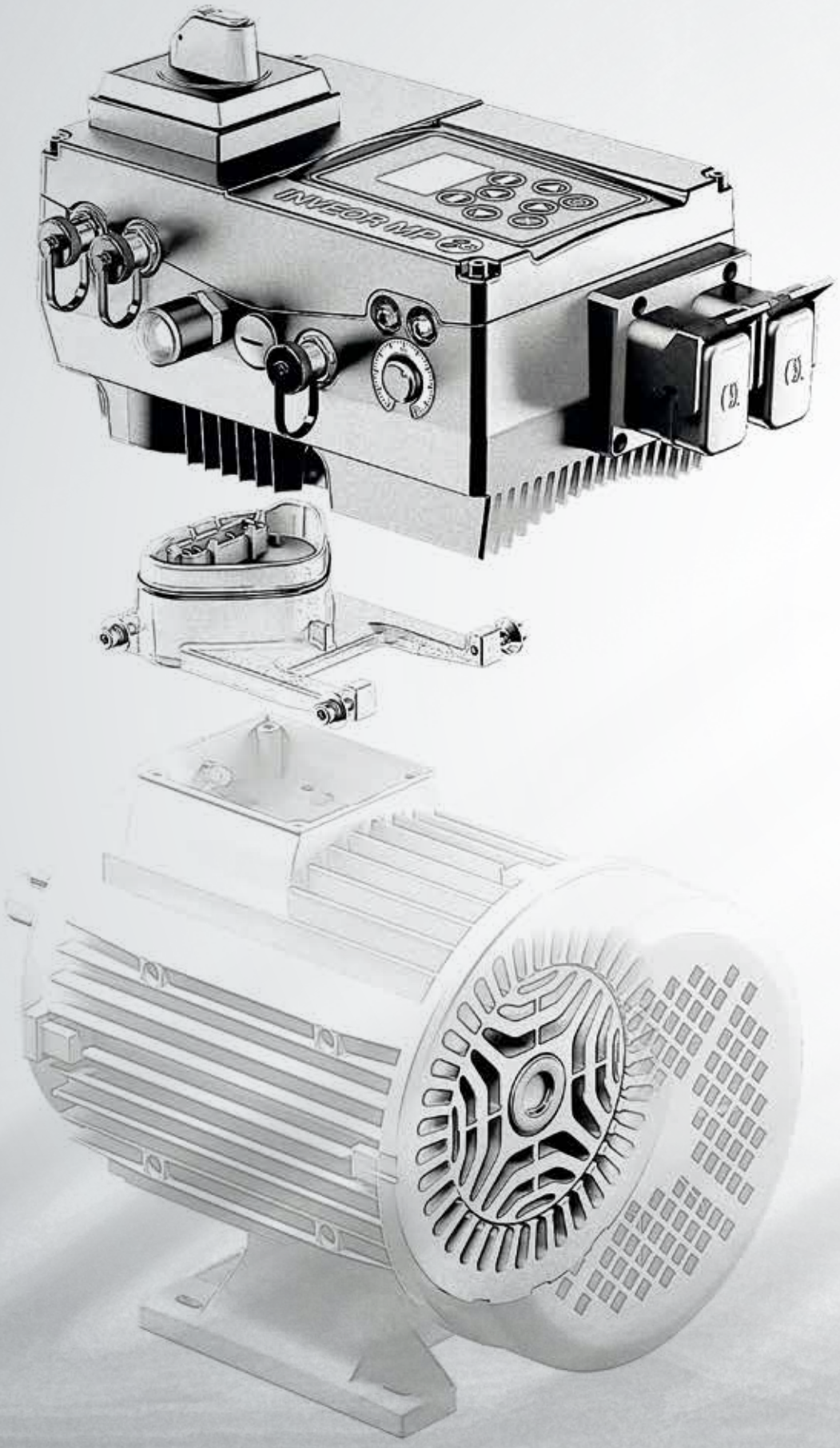
* size A-C only in combination with Harting or Quickon

Power PCB card options

INVEOR sizes	A	B	C	D
Brake chopper	■	■	■	■

■■ present as standard ■ option available

INVEOR MPM



Order code

The INVEOR MPM order code comprises a total of 12 individual items. Each item determines one stage of the INVEOR MPM configuration relating to the various device characteristics.

Item	Code	
1	INV MP	**INVEOR type** Inverter, motor-integrated, Performance
2	x	**Size** A, B, C, D
3	VSxx	**Version** MPM
4	IVxx	**Supply voltage** 400 V
5	PWxx	**Recommended motor rating** 0.55 kW to 30 kW
6	LPxx	**Power PCB** with and without brake chopper
7	APxx	**Module carrier**
8	GHxx	**Housing configuration** Cooling type, screw connections, potentiometer and attachments, plug
9	DKxx	**Cover variant** and controls
10	OAxx	**Option module** Brake module, main switch
11	IOxx	**IO module** Input/output configuration, Bluetooth, Field bus
12	COxx	**Model** Standard or special model

Here you can configure the INVEOR and enter the order code:

Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12

The configuration starts on **page 69**.
Please state this complete order code when ordering.

The route to your INVEOR MPM

The route to your INVEOR MPM configuration is illustrated below. For each of the 12 items, you make a configuration decision, producing one part of the order code. Together all 12 sub-codes produce your total order code, clearly defining your INVEOR MPP.

Item 1: INVEOR type

INVEOR MPM

Item 2: Size

0.55 kW – 2.2 kW	2.2 kW – 5.5 kW	5.5 kW – 11 kW	11 kW – 30 kW
A	B	C	D

Item 3: Version

INVEOR MP

Item 4: Supply voltage

400 V

Item 5: Recommended motor rating

0.55 kW – 30 kW

Item 6: Power PCB

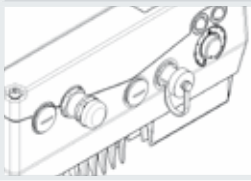
Brake chopper

- ☐ Yes
- ☐ No

Item 7: Module carrier

- ☐ Yes
- ☐ No

Item 8: Housing configuration



- ■ Cable screw connections
- ■ Cooling type
- ■ Plug

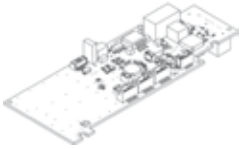
Item 9: Cover variant

- ■ without controls
- ■ MMI
- ■ Main switch

Item 10: Option module

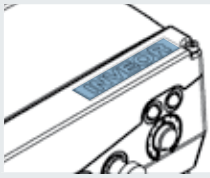
- ■ Main switch
- ■ Brake module

Item 11: IO module



- ■ Field bus
- ■ Functional safety

Item 12: Model



A Selection of accessories: Motor adaptation, operation and observation, communication, additional accessories as of **page 72.**

Configuration
INVEOR MPM

Item 1: INVEOR type	INV x

	**INVEOR MPM** **motor- and wall-mounted**	**INV MP**

Item 2: Size	x

The motor rating is key to the choice of size.
Please select the power range into which your motor rating falls.

Size selection

Motor rating	Size	Item number
0,55 kW – 2,2 kW	**A**	10352061
2,2 kW – 5,5 kW	**B**	10352062
5,5 kW – 11 kW	**C**	10352063
11 kW – 30 kW	**D**	10352064

Item 3: Version	VSxx

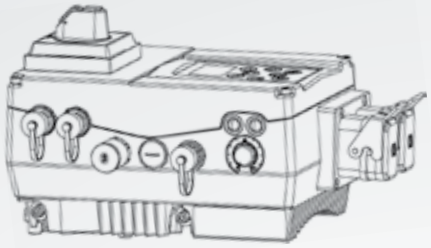
MPM	**VS02**

Item 4: Supply voltage	IVxx

400 V	**IV01**

Other configuration points are listed on the following pages.

Configuration
INVEOR MPM
Size A-D (0.55 – 30 kW)



Item 5: Recommended motor rating					PWxx
Size	**Power Class**	**Nominal current [A]***	**Overload 60 sec.***	**Overload 3 sec.***	
A	0.55 kW	1.7	150%	200%	PW03
	0.75 kW	2.3	150%	200%	PW04
	1.10 kW	3.1	150%	200%	PW05
	1.50 kW	4.0	150%	200%	PW06
	2.20 kW LD*	4.8	110%	150%	PW46
B	2.20 kW	5.6	150%	200%	PW07
	3.00 kW	7.5	150%	200%	PW08
	4.00 kW	9.5	150%	200%	PW09
	5.50 kW LD*	11.0	110%	150%	PW49
C	5.50 kW	13.0	150%	200%	PW10
	7.50 kW	16.5	150%	200%	PW11
	11.0 kW LD*	22.0	110%	150%	PW51
D	11.0 kW	28.0	150%	200%	PW12
	15.0 kW	34.0	150%	200%	PW13
	18.5 kW	40.0	150%	200%	PW14
	22.0 kW	46.0	150%	200%	PW15
	30.0 kW LD*	60.0	110%	150%	PW55

⚠ Recommended motor rating (4-pole asynchr. motor) is given based on the 400 VAC supply voltage.
* LD = Low Duty, Details see data sheet

Item 6: Power PCB		LPxx
Size	**Variant**	
A - D	without brake chopper	LP01
	with brake chopper (for connecting a brake resistor)	LP02
B	without brake chopper, heavy duty version	LP53

Item 7: Module carrier	APxx

The module carrier is absolutely essential for the main switch, brake module or I/O module options

with module carrier (not with IO00)	AP00
without module carrier (only with OA00 and IO00)	AP90

Item 8: Housing configuration		GHxx	
Size	**Variant**	**without Potentiometer**	**with Potentiometer****
A - C	Passive cooling type	GH02	GH01
	Passive cooling type, brake resistor*	GH45	GH44
	Passive cooling type, Quickon, M12 IO**	GH53	GH52
	Passive cooling type, brake resistor*, Quickon, M12 IO**	GH57	GH56

Continuation of the table on the following page.

Item 8: Housing configuration — GHxx

Size	Variant	without potentiometer	with potentiometer**
A - B	Passive cooling type, Harting, M12 IO**	GH51	GH50
	Passive cooling type, brake resistor*, Harting, M12 IO**	GH55	GH54
C	Active cooling type	GH09	GH06
	Active cooling type, brake resistor*	GH62	GH61
D	Active cooling type	GH09	GH06
	Active cooling type, M12 IO**	GH64	GH63

* only with LP02

** not with IO00

⚠ Please remember that an adapter plate is needed for each device. Details on **page 74 / 75.**

Item 9: Cover variant — DKxx

Cover without controls	DK01
Cover with integrated MMI (not with IO00 - IO02)	DK05
Cover with main switch (only with OA1X)	DK11
Cover with main switch, MMI (only with OA1X / not with IO00 - IO02)	DK15

Item 10: Option module — OAxx

To select an option, the AP00 module carrier is required.

no option module	OA00
Main switch (only with DK1X)	OA10
Brake module (brake rectifier)	OA30
Main switch (only with DK1X) + brake module (Not with Ethernet fieldbus)	OA13

Item 11: IO module — IOxx

To select an option, the AP00 module carrier is required.

Variant	Field bus		with
without IO module	***	IO00	-
IO module 1 3DI* / 1DO* / 1 potentiometer**	***	IO01	IO02
IO module 1 with M12 MMI plug 3DI* / 1DO* / 1 potentiometer**	***	IO03	IO04
IO module 1 with M12 MMI plug 1 M12 STO / 3DI* / 1DO* / 1 potentiometer**	***	IO13	IO14
IO module 1 with M12 MMI plug 3DI* / 1DO* / 1 Potentiometer**	PROFINET	IO23	IO24
IO module 1 with M12 MMI plug 1 M12 STO / 3DI* / 1DO* / 1 potentiometer**	EtherNet/IP EtherCAT	IO33	IO34

* can be done using M12 IO plugs (2 items), should also be configured via the GH feature. Details on **page 64**

** The potentiometer should also be configured via the GH feature

*** M12 connector in accessories item no. 10118224

Item 12: Model — COxx

Selection of standard or special model

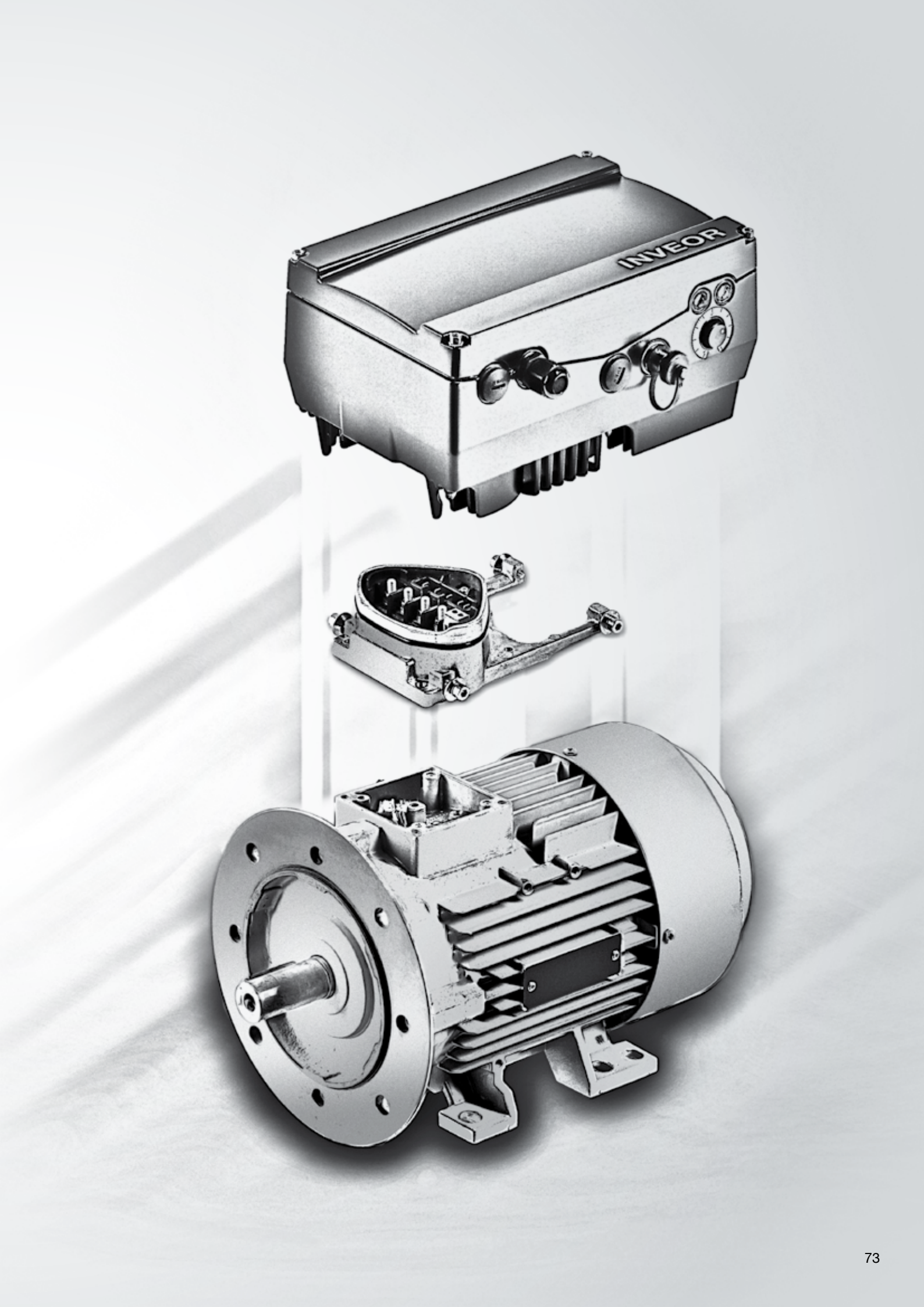
KOSTAL standard	CO00

⚠ For models with a customer label, please get in touch with your KOSTAL contact.

Accessories for INVEOR MPM can be found on page 72.

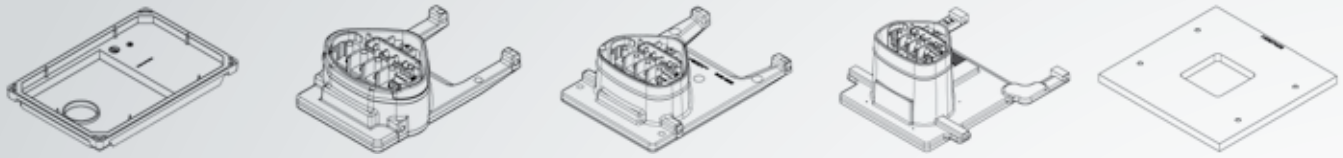
INVEOR

Accessories


INVEOR

Motor adaptations

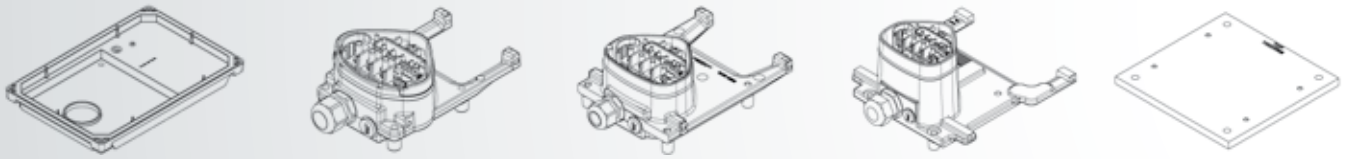
Thanks to the innovative adapter plate concept, the INVEOR drive controller is compatible with virtually all motors. With the standard adapter plates without holes, customers can flexibly produce hole patterns to suit their needs themselves. There are also pre-drilled adapter plates for many motor models. Wall mounting plates are available for mounting close to the motor.



Standard adapter plates (ADP)

Motor size											
63	71	80	90	100	112	132	160	180	INVEOR size	Hole pattern	Item number
dependent on motor									α	freely selectable*	10117052
									A INVEOR M	freely selectable*	10108906
									A INVEOR MP / MPM	freely selectable*	10506789
									B	freely selectable*	10026184
									C	freely selectable*	10025632
									D	freely selectable*	10098202
									D HD model	freely selectable*	10145362

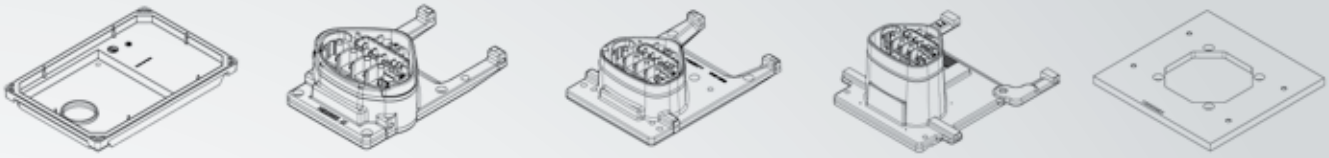
* The hole pattern is produced by the customer and should therefore be flexibly adapted to the motor



Mounting adapter plates on wall

Motor size										
63	71	80	90	100	112	132	160	180	INVEOR size	Item number
not dependent on motor									α	10117051
									A INVEOR M	10023107
									A INVEOR MP / MPM	10506806
									B	10026185
									C	10025932
									D	10098170
									D HD model	10340314

⚠ Please talk to your KOSTAL contact regarding precise batch sizes of individual accompanying items.
Illustrations may deviate from the original.



Adapter plate for motors 1LA7 / 1LA9

Motor size												
63	71	80	90	100	112	132	160	180	INVEOR size	Hole pattern [mm] Terminal box holder	Thread	Item number
■	■	■	■						α	51x51	M4	10117056
■	■	■	■						A (INV M)	64x64	M4	10023843
■	■	■	■						B	64x64	M4	10114861
				■	■				B	105x105	M5	10091120
				■	■				C	105x105	M5	10106344
						■			C	125x125	M5	10025933
						■			D	125x125	M5	10107137
							■	■	D	150x150	M5	10101828

Adapter plate for motors 1LE1…1

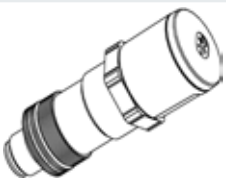
Motor size												
63	71	80	90	100	112	132	160	180	200	INVEOR size	Hole pattern [mm] Terminal box holder	Thread	Item number
		■	■							α	47x22	M4	10117054
		■	■							A (INV M)	47x22	M4	10112586
		■	■							A (INV MP)	47x22	M4	10516595
		■	■							B	47x22	M4	10175186
				■	■					B	75x75	M4	10096094
				■	■					C	75x75	M4	10108013
						■				C	90x90	M4	10096099
						■				D	90x90	M4	10098193
							■	■		D	100x100	M5	10101827
									■	D	80x 80	M6	10529838

Adapter plate for motors FCA

Motor size												
63	71	80	90	100	112	132	160	180	INVEOR size	Hole pattern [mm] Terminal box holder	Thread	Item number ADP
■	■	■							A (INV M)	54x54	M5	10112914
			■	■					A (INV M)	60x60	M5	10112915
			■	■					B	60x60	M5	10112916
					■	■			B	68x68	M5	10112918
					■	■			C	68x68	M5	10112921
							■	■	D	102x102	M6	10130526

⚠ Please talk to your KOSTAL contact regarding precise batch sizes of individual accompanying items.
Illustrations may deviate from the original.

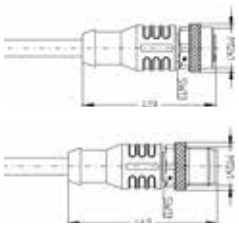
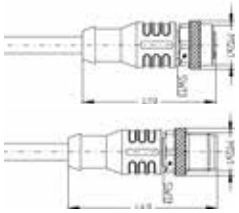
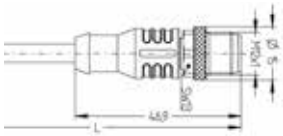
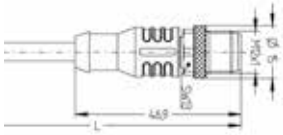
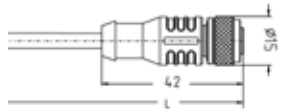
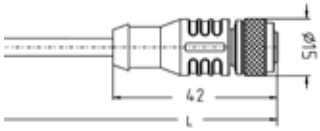
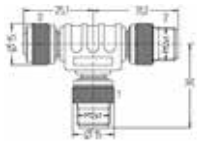
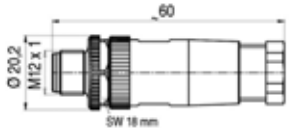
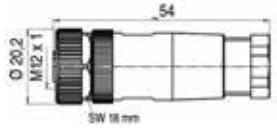
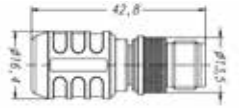
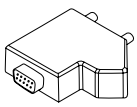
Operation and observation

	Description	Item number
	**INVEOR M cover size A** without label, including cover screws	10116057
	INVEOR M cover size B without label, including cover screws	10116058
	INVEOR M cover size C without label, including cover screws	10116059
	INVEOR M cover size D without label, including cover screws	10116060
	**INVEOR M cover size A with foil keypad + potentiometer** without label, neutral foil keypad, including cover screws	10116583
	INVEOR M cover size B with foil keypad + potentiometer without label, neutral foil keypad, including cover screws	10116584
	INVEOR M cover size C with foil keypad + potentiometer without label, neutral foil keypad, including cover screws	10116585
	INVEOR M cover size D with foil keypad + potentiometer without label, neutral foil keypad, including cover screws	10116586
	**INVEOR M cover size A with integrated MMI** without label, including cover screws	10174751
	INVEOR M cover size B with integrated MMI without label, including cover screws	10174752
	INVEOR M cover size C with integrated MMI without label, including cover screws	10174753
	INVEOR M cover size D with integrated MMI without label, including cover screws	10174754
	**MMI handheld controller** including 3 m connection cable RJ9 on M12 plug	10004768
	**Programming and diagnosis cable 2 m** for PC, USB on M12 plug, RS485 with integrated converter	10023950
	**Bluetooth stick for M12 service interface** for wireless communication with mobile devices	10447294
	**Touch operating terminal (Modbus RTU)** 7” TFT LCD Touch Screen 16M Color 600MHz RISC CPU Ethernet	10507912
	**Touch operating terminal (Modbus RTU)** 10” TFT LCD Touch Screen	10534609

⚠ Please talk to your KOSTAL contact regarding precise batch sizes of individual accompanying items.
Illustrations may deviate from the original.

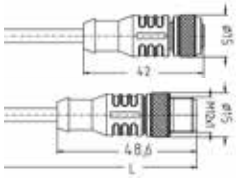
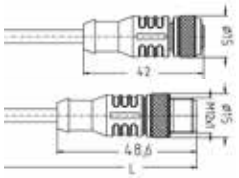
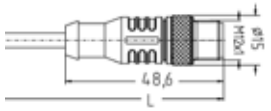
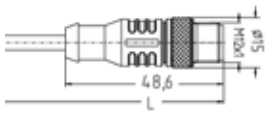
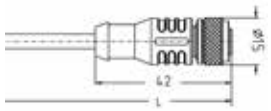
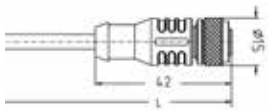
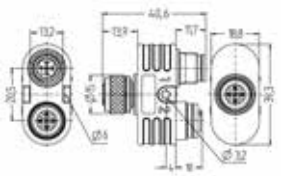
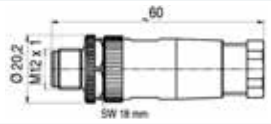
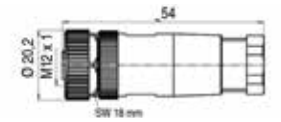
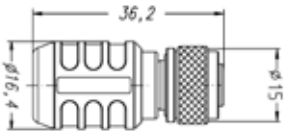
Communication fieldbus components

RS485 fieldbus components /Modbus RTU/Touch operating terminal

	Description	Item number
	**M12 connecting cable 2 m** M12 plug on M12 coupling / RS485 / 4-pin / 2 m / A-coded	10272382
	**M12 connecting cable 5 m** M12 plug on M12 coupling / RS485 / 4-pin / 5 m / A-coded	10272793
	**M12 connection cable open 2 m** M12 plug / open / RS485 / 4-pin / 2 m / A-coded	10272795
	**M12 connection cable open 10 m** M12 plug / open / RS485 / 4-pin / 10 m / A-coded	10272794
	**M12 connection cable open 2 m** M12 coupling / open / RS485 / 5-pin / 2 m / A-coded	10138807
	**M12 connection cable open 10 m** M12 coupling / open / RS485 / 5-pin / 10 m / A-coded	10138809
	**M12 T-splitter** M12 plug on plug and socket / RS485 / 4-pin / A-coded	10272829
	**M12 plug can be self-assembled** M12 plug / RS485 / 4-pin / A-coded	10137294
	**M12 coupling can be self-assembled** M12 coupling / RS485 / 4-pin / A-coded	10272796
	**M12 terminating resistor 120 Ohm** M12 plug / RS485 / 5-pin / A-coded	10343387
	**D-SUB bus plug** D-SUB bus plug with screw connection, RS485, 9-pin Socket	10519423

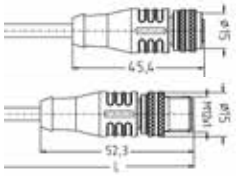
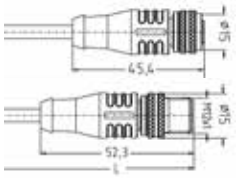
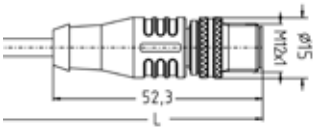
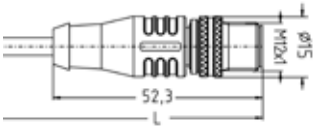
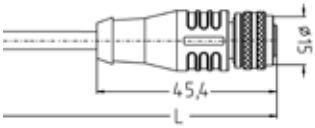
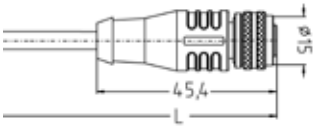
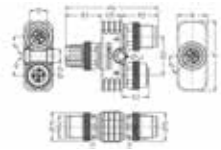
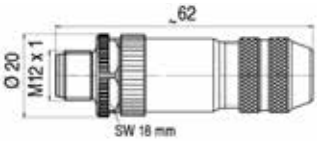
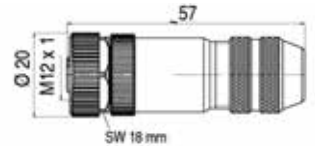
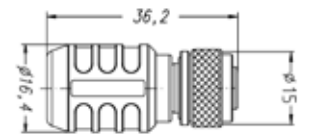
⚠ Please talk to your KOSTAL contact regarding precise batch sizes of individual accompanying items.
Illustrations may deviate from the original.

CANopen fieldbus components

	Description	Item number
	**M12 connecting cable 2 m** M12 plug on M12 coupling / CANopen / 5-pin / 2 m / A-coded	10138812
	**M12 connecting cable 5 m** M12 plug on M12 coupling / CANopen / 5-pin / 5 m / A-coded	10138813
	**M12 connection cable open 2 m** M12 plug / open / CANopen / 5-pin / 2 m / A-coded	10138804
	**M12 connection cable open 10 m** M12 plug / open / CANopen / 5-pin / 10 m / A-coded	10138806
	**M12 connection cable open 2 m** M12 coupling / open / CANopen / 5-pin / 2 m / A-coded	10138807
	**M12 connection cable open 10 m** M12 coupling / open / CANopen / 5-pin / 10 m / A-coded	10138809
	**M12 Y-splitter** M12 coupling on plug and coupling / CANopen / 5-pin / A-coded	10138791
	**M12 plug can be self-assembled** M12 plug / CANopen / 5-pin / A-coded	10138799
	**Coupling can be self-assembled** M12 coupling / CANopen / 5-pin / A-coded	10138801
	**M12 terminating resistor** M12 coupling / CANopen / 5-pin / A-coded	10138793

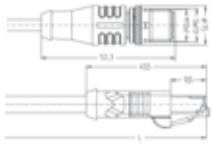
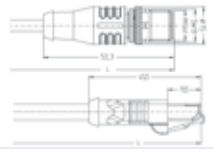
⚠ Please talk to your KOSTAL contact regarding precise batch sizes of individual accompanying items.
Illustrations may deviate from the original.

PROFIBUS fieldbus components

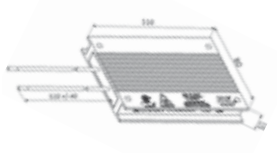
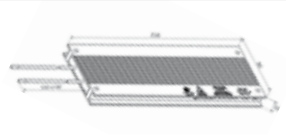
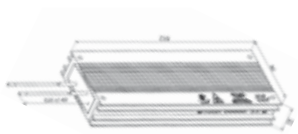
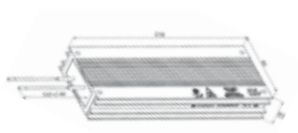
	Description	Item number
	**M12 connecting cable 2 m** M12 plug on M12 coupling / PROFIBUS / 5-pin / 2 m / B-coded / colour: purple	10272791
	**M12 connecting cable 5 m** M12 plug on M12 coupling / PROFIBUS / 5-pin / 5 m / B-coded / colour: purple	10272792
	**M12 connection cable open 2 m** M12 plug / open / PROFIBUS / 5-pin / 2 m / B-coded / colour: purple	10272786
	**M12 connection cable open 10 m** M12 plug / open / PROFIBUS / 5-pin / 10 m / B-coded / colour: purple	10272789
	**M12 connection cable open 2 m** M12 coupling / open / PROFIBUS / 5-pin / 2 m / B-coded / colour: purple	10272790
	**M12 connection cable open 10 m** M12 coupling / open / PROFIBUS / 5-pin / 10 m / B-coded / colour: purple	10272385
	**M12 Y-splitter** M12 plug on coupling and plug / PROFIBUS / 4-pin / B-coded P PROFIBUS Y-Stück 0798540	10272780
	**M12 plug can be self-assembled** M12 plug / PROFIBUS / 5-pin / B-coded	10272785
	**M12 coupling can be self-assembled** M12 coupling / PROFIBUS / 5-pin / B-coded	10272387
	**M12 terminating resistor** M12 plug / PROFIBUS / B-coded	10272784

⚠ Please talk to your KOSTAL contact regarding precise batch sizes of individual accompanying items.
Illustrations may deviate from the original.

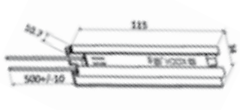
EtherCAT, PROFINET, Sercos III, Ethernet IP

	Description	Item number
	**M12 connecting cable 2 m** M12 plug / RJ45 plug / 4-pin / 2 m / D-coded / colour: green	10138814
	**M12 connecting cable 5 m** M12 plug / RJ45 plug / 4-pin / 5 m / D-coded / colour: green	10138847
	**M12 connecting cable 2 m** M12 plug / M12 plug / 4-pin / 2 m / D-coded / colour: green	10138848
	**M12 connecting cable 5 m** M12 plug / M12 plug / 4-pin / 5 m / D-coded / colour: green	10138849

Brake resistors

	Description	Power [W]	ED [%]	Item number
	**INVEOR M/P brake resistor** Size A 100 W, 100 Ω, IP65, connection cable 510 mm, L=110 mm W=80 mm H=15 mm	550 750 1,100 1,500	13.60 10.00 6.80 5.00	10138851
	**INVEOR M/P brake resistor** Size B 200 W, 50 Ω, IP65, connection cable 510 mm, L=216 mm W=80 mm H=15 mm	2,200 3,000 4,000	9.00 6.66 5.00	10138852
	**INVEOR M/P brake resistor** Size C 240 W or 400 W*, 72 Ω, IP65, connection cable 510 mm, L=216 mm W=80 mm H=30 mm	5,500 7,500	4.3 / 7.3* 3.2 / 5.3*	10138853
	**INVEOR M/P brake resistor** Size D 2 x 240 W or 2 x 400 W*, 2 x 72 Ω, IP65, connection cable 510 mm, 2 x L=216 mm W=80 mm H=30 mm	11,000 15,000 18,500 22,000	4.4 / 7.2* 3.2 / 5.3* 2.6 / 4.3* 2.2 / 3.6*	2 x 10138853

(*) without UL

	Description	Item number
	**Brake resistors with mounting frame** Assembly kit for INVEOR M size C including 2 x 100 Ω brake resistor, mounting frame, screws	10121035
	**PTC brake resistor** Self-protecting, 70 W, 175 Ω, IP20, Connection cable 500 mm, L=115 mm W=34 mm H=10.5 mm	10268264

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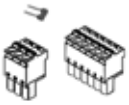
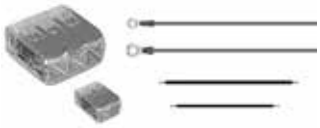
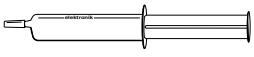
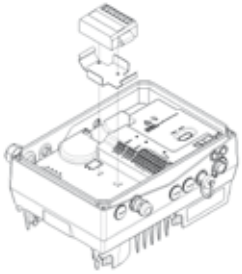
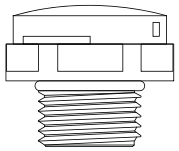
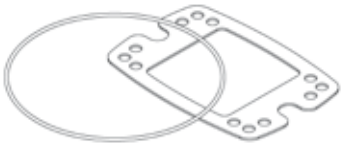
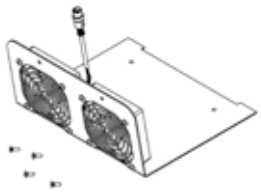
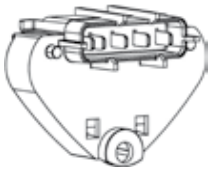
Specific accessories for INVEOR M α, MPM and INVEOR P

	Description	Typ / Size	Item number
	**Screw connections** Screw connections (2x M16) and blind plugs (2x M16 black, 1x M16 transparent)	**INVEOR M** Size α	10118230
	**Screws** 4x cooling element screws + 1x ground screw	**INVEOR M** Size α	10118227
	**Terminals** Plug terminals for connecting mains cable and motor supply cable/PTC including jumper	**INVEOR M/P** Size α	10118222
	**Cable set** Cable set for extending the motor connection (including crimp material)	**INVEOR M/P** Size α	10118226
	**Adapter for jack plug on M12** Adapter for jack plug on M12 for MMI/PC cable connection	**INVEOR M/P** Size α	10118219
	**M12 screw-in coupling MMI/ PC / Modbus/IO plug** M12 screw-in coupling on JST 4-pin, A-coded, cable length 240 mm, M16 x 1.5, including captive protective cap	**INVEOR M** Size α **NVEOR MPM** Size A-D **INVEOR P** Size α to D	10118216
	**Potentiometer** Potentiometer on JST 3-pin for screwing in, cable length 180 mm, including reducer M16 x 1.5 and scale	**INVEOR M** Size α **INVEOR P** Size α to D	10118232
	**M12 screw-in plug CANopen** M12 screw-in plug on JST 3-pin, for CANopen connection, A-coded, cable length 110 mm, M16 x 1.5, including captive protective cap	**INVEOR M** Size α **NVEOR MPM** Size A-D **INVEOR P** Size α to D	10118224
	**M12 screw-in coupling PROFIBUS** M12 screw-in coupling on JST 9-pin, for PROFIBUS connection, B-coded, cable length 100 mm, M16 x 1.5 Line set. Inveor 4-pin Profibus cpl.	**INVEOR P** Sizes A to D	10056418
	**M12 screw-in coupling EtherCAT / PROFINET / Sercos III** M12 screw-in coupling on RJ45 for EtherCAT / PROFINET / Sercos III connection, D-coded, cable length 170 mm, M16 x 1.5 Line set. Inveor EtherCAT 4-pin cpl.	**INVEOR P** Sizes A to D	10085888
	**Heat transfer paste** Heat transfer paste for connecting INVEOR P cold plate to thermal sink, contents 5 ml	**INVEOR P** Sizes α to D	10139778

Small parts and attachments

	Description	Item number
	**Brake module for INVEOR M** to control a mechanical brake on the motor end, including retaining plate, screws, varistor ⚠ Not in combination with size α or the basic application circuit board	10136409
	**M16 aeration element** M16x1.6, material: PA 6 housing, ventilation element Acrylic Co-Polymer on Nylon Support, Chloroprene seal	10142939
	**Sealing set for cups INVEOR size D** O-ring, flat seal, 2x retaining bolts with spring ring	10253835
	**Fan unit with retaining bolts** for size D	10142453
	**Screws for adapter plates for INVEOR size A / B / C** 4x retaining bolt for adapter plate, 1x ground screw with spring ring Accessories. Inveor MABC Bef. BGR	10072211
	**Insert for adapter plate BG A for INVEOR MP family** For converting motor-specific adapter plates of the INVEOR M family	10538853

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Illustrations may deviate from the original.

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