



for a greener tomorrow

# GUIDED OPERATOR SOLUTIONS

Eliminate mistakes in manual picking processes



- Improve product quality
- Increase operator efficiency and speed
- Enhance overall operational effectiveness

# A lean strategy in human mistake prevention

At parts assembly production sites, where parts are picked from stock, it is almost inevitable that picking mistakes will occur. As parts become more complex and their component types increase, the problem of picking mistakes grows. With Mitsubishi Electric's Guided Operator Solutions, such mistakes can be easily eliminated, helping to reduce waste, improve quality and boost productivity.



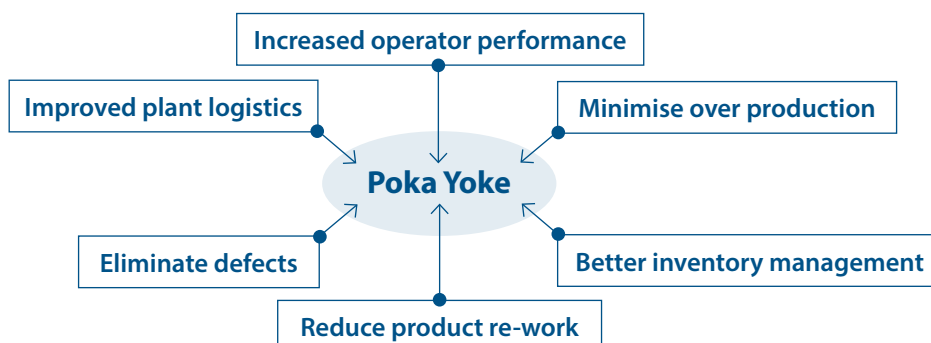
Lights or doors guide the operator to the correct box

## Poka Yoke = mistake prevention

Statistically, it has been found that human error when picking parts is one of the most significant causes of mistakes in assembly operations. Typical problems include picking the wrong parts with a similar shape or name, picking and assembling parts out of sequence, or simply missing a part from a sequence.

While product inspection can prevent faulty goods being shipped to customers, it does little to prevent those defects from being introduced into the product in the first place. While for some companies a certain level of waste or rework will be accepted, for others there will be the desire to eliminate mistakes earlier in the production process before real value has been added to the product.

To solve these issues Mitsubishi Electric have developed their integrated Guided Operator Solutions, based on the principles of Poka Yoke, a Japanese term that translates generally as 'mistake prevention'. Poka Yoke is a method of eliminating mistakes in a manufacturing or logistics operation at source before they can occur.

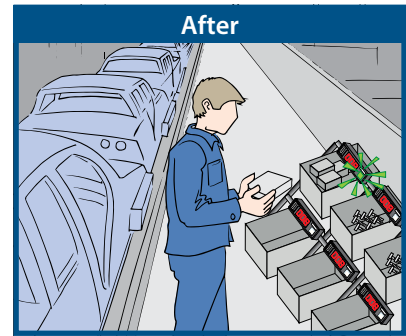


# Tangible benefits

The costly impact of quality issues is largely recognised for manufacturing companies that engage in assembly tasks. Mitsubishi Electric's Guided Operator Solutions not only significantly reduce the risk of these quality issues occurring but they also can be deployed in a diverse range of industry sectors where the benefits can be identified by both managers and operators.



## Automotive Assembly



Time to read part list and instructions

No parts list or instructions

Operator must search for parts

No need to search for parts

Slow assembly time

Faster assembly time

Potential for incorrect parts assembly

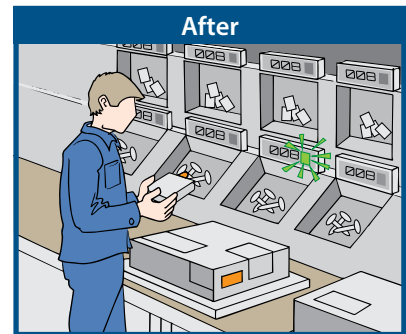
Increased assembly quality

Extensive operator training required

Reduced operator training requirements



## Electronics Assembly



In a typical application, where personnel are required to pick a number of different parts or products from bins in sequence, the chances of the worker correctly picking the parts with 100% reliability every time are small. At the very least, a significant proportion of the production time will be taken up by looking for the right part and ensuring that it is indeed

the correct part number. In the worst case, a mistake introduced into the product will go unnoticed until further up the production line - if at all.

However, with the Mitsubishi Electric Guided Operator Solutions in place, the automation system guides the worker to the correct parts bin, perhaps by

simply lighting an indicator next to the correct picking location, or by opening a shutter and requiring an operator acknowledgement of the successful pick of the correct part. Picking becomes not only inherently more reliable and mistake-free but also much faster, so both quality and overall productivity improve.

# A totally integrated solution

## Simple

The design of the Guided Operator Solutions has been based on simplistic concepts. Terminals are easily installed on pipe racking and connected via a dedicated cable that avoids the need to run multiple cables back to the main controller, significantly saving on wiring costs.

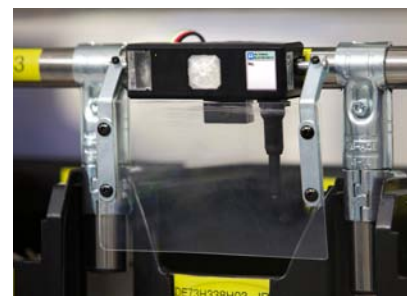
Intuitive connectors also enable fast installation of networks without the need to cut or strip the wires. Terminals are quickly setup with an address writer and using a dedicated software they can be directly mapped to the controller. This allows the applications to be easily configured, programmed and maintained.

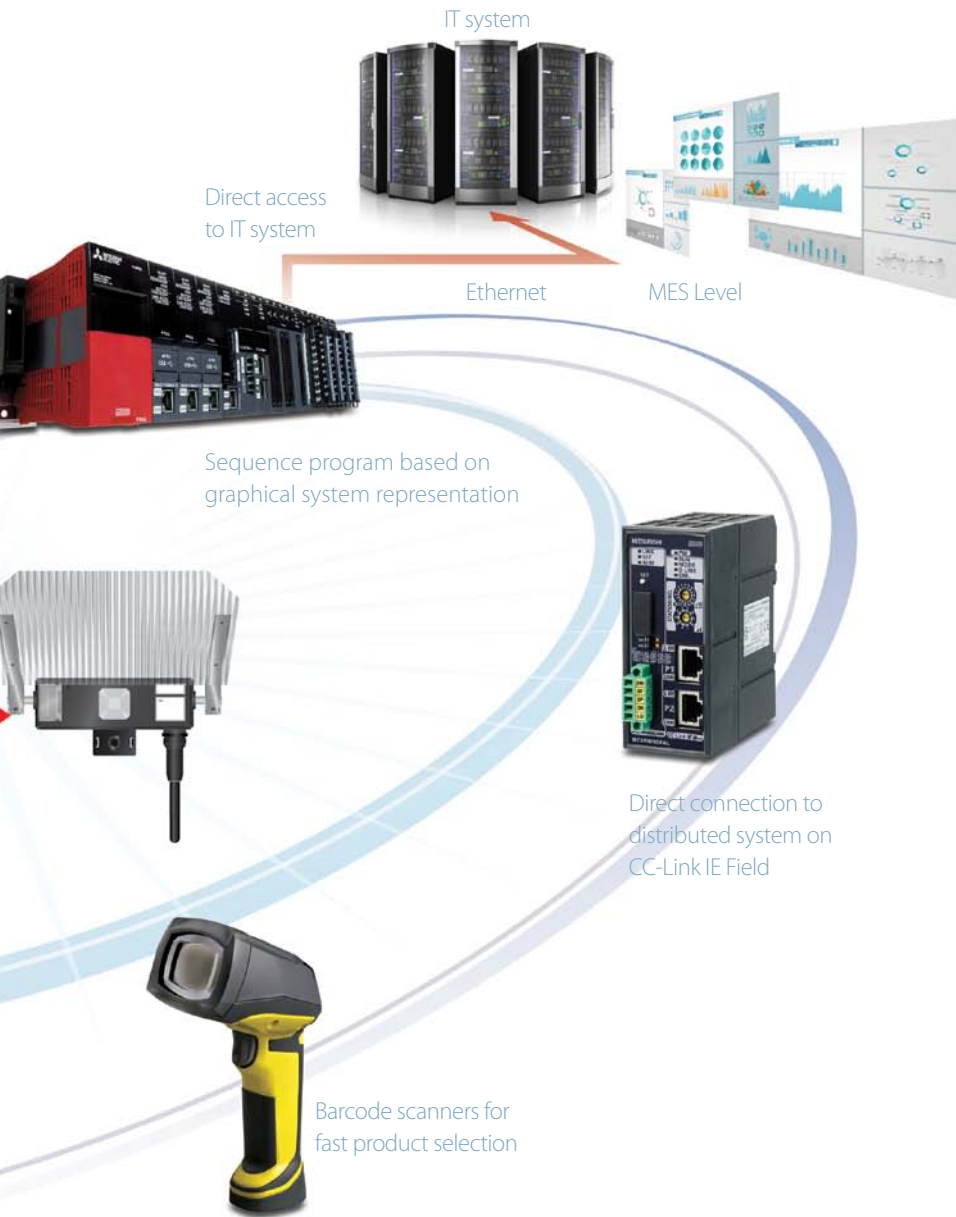


## Versatile

The sheer variety of the terminals available makes Mitsubishi Electric's solution suitable for almost any application. For example, photoelectric sensors provide options for applications where high picking speed is a necessity. Alternatively for more cost sensitive applications an array of push button and lever type feedback actuators can be provided.

Terminals with opening/closing doors provide a physical barrier to selecting the wrong part, a highly effective method to eliminate mistakes. Additionally some devices are fitted with a display to identify how many pieces should be picked from any bin, again increasing operator effectiveness.





## Integrated

Often assembly tasks must fit into the wider operational environment of the plant. This is essential to avoid the issues of over and under production. It is also important to consider the resource planning for parts used in the picking operations.

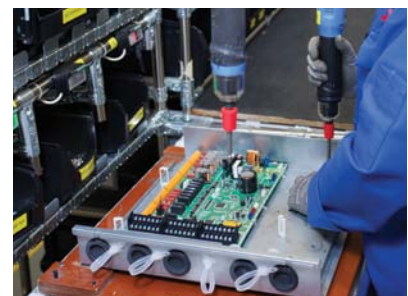
To permit connectivity to multiple picking applications within the plant dedicated bridges connect stations over CC-Link and CC-Link IE networks. High speed data communication enables synchronisation of tasks, but also allows assembly cells to be distributed according to the needs of the production site. Furthermore, direct integration of MES technology permits the Guided Operator Solutions to be connected to high level organisational systems so that output and resource planning are controlled in real time.



## Expandable

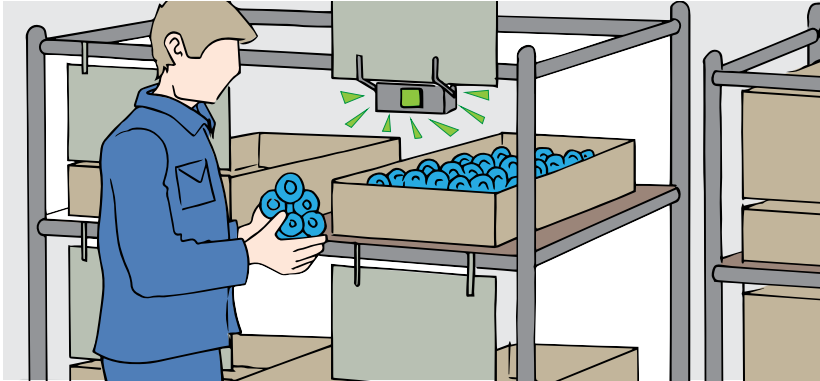
At the heart of the Guided Operator Solutions are Mitsubishi Electric controllers with dedicated masters communicating with the network of terminals. Depending on the complexity of the application, simple control can be provided using FX series PLCs or for more advanced applications the L series or Q series PLCs can be configured.

Through connecting other devices to the controller such as bar code scanners, electric screwdrivers or vision systems, Guided Operator Solutions can be tuned to the exact needs of the operator. Further enhancements can be achieved through the selection of Mitsubishi Electric's intuitive GOT HMIs to display work instructions or alternatively drive and robotic technology can be integrated into the manufacturing cell.



# Typical applications

Guided Operator Solutions, sometimes known as pick to light solutions, were originally deployed in the automotive sector. However, with Mitsubishi Electric's wide array of ergonomically designed terminals it is possible to deploy these solutions in many other industry areas that include; logistics, semiconductor and life science sectors.



## Picking

Picking is a key area where production efficiency can be improved and where product quality can be enhanced. Guided Operator Solutions significantly reduce overall man-hours, eliminate mistakes in parts picking, and also reduce operator fatigue.



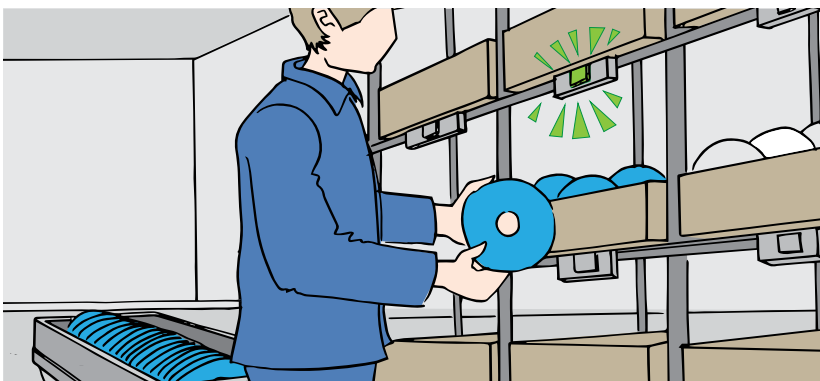
## Parts replenishment

Parts replenishment is another area where mistakes can occur, and these can have knock-on effects in quality control in assembly. Guided Operator Solutions identify exactly where parts need to be replenished and ensure that correct parts are added to the bin.



## Production cell

The 'cell production' model for assembly is becoming common at plants focused on 'high mix, low volume' production, with a single operator responsible for the complete assembly of a product. Guided Operator Solutions can eliminate mistakes at source reducing the risk of re-work on the product.



## Kitting

Kitting out a tray with components for a subsequent manufacturing process requires an operator to pick a number of parts from a number of different bins, following detailed work instructions for components and quantities. Guided Operator Solutions ensure the right components are added to the kit box in the right quantities, saving time and reducing mistakes.

# Terminal options

Guided Operator Solutions offer a variety of terminal types, they range from a simple LED and push button device through to door operated terminals. Options for lever switch and photoelectric terminals are also available.

IMAGE	MATERIAL NAME	DESCRIPTION	ARTICLE NUMBER
	<b>BL227XB-K02VN-P</b>	Compact, pushbutton switch, single colour indication	295195
	<b>BL227XB-K06MN-P</b>	Compact, pushbutton switch, multi colour indication	295196
	<b>BL227XB-K71VN-P</b>	Standard compact, pushbutton switch, single colour indication, 7 segment display	295197
	<b>BL227XB-K02V-P</b>	Standard compact, lever switch, single colour indication	295198
	<b>BL227XB-K06M-P</b>	Standard compact, lever switch, multi colour indication	295199
	<b>BL227XB-K71V-P</b>	Standard compact, lever switch, single colour indication, 7 segment display	295200
	<b>BL227XB-K02VL-P</b>	Standard compact, photoelectric downward reflection, single colour indication	295201
	<b>BL227XB-F04V-P</b>	Standard, door, lever switch, single colour indication	290111
	<b>BL227PB-T07P02V-P</b>	Photoelectric transmission (emission), single colour indication, 70 mm	295202
	<b>BL227XB-T07P02V-C</b>	Photoelectric transmission (reception), single colour indication, 70 mm	295203
	<b>BL227PB-T14P02V-P</b>	Photoelectric transmission (emission), single colour indication, 140 mm	295204
	<b>BL227XB-T14P02V-C</b>	Photoelectric transmission (reception), single colour indication, 140 mm	295205

Note: Accessories next page

# Accessories

MATERIAL NAME	DESCRIPTION	ARTICLE NUMBER
ARW-04-RH	Address writer (ARW-04 +Infrared ray remote head)	295478
FK4-125-100	4-core flat cable (1.25 sq), 100m winding	290883
LP4-WR-10P	LP connector For 4-core flat cable (1.25 sq), 10 connectors included.	290884
BT0	Terminator (for ASLINK series)	290896
LP-TOOL	Crimping tool for LP connector	289161
ANF-01	ASLINK Filter	295479

# Masters and gateways

MATERIAL NAME	DESCRIPTION	ARTICLE NUMBER
RJ51AW12AL	MELSEC iQ-R AnyWireASLINK master module	301856
QJ51AW12AL	MELSEC Q series AnyWireASLINK master module	290141
LJ51AW12AL	MELSEC L series AnyWireASLINK master module	290898
FX3U-128ASL-M	MELSEC FX series AnyWireASLINK master module	290900
NZ2AW1C2AL	CC-Link AnyWireASLINK bridge module	294278
NZ2AW1GFAL	CC-Link IE AnyWireASLINK bridge module	297161



Scan the code to watch the movie and learn how Mitsubishi Electric employs Guided Operator Terminals in their own manufacturing operations to eliminate picking mistakes and guarantee product quality!

## European Offices

Mitsubishi Electric Europe B.V. Mitsubishi-Electric-Platz 1 D-40882 Ratingen Phone: +49 (0)2102 / 486-0	Germany	Mitsubishi Electric (Russia) LLC 52, bld. 1 Kosmodamianskaya emb. RU-115054 Moscow Phone: +7 495 / 721 2070	Russia
Mitsubishi Electric Europe B.V. Radická 751/113e Avenir Business Park CZ-158 00 Praha 5 Phone: +420 251 551 470	Czech Rep.	Mitsubishi Electric Europe B.V. Carretera de Rubí 76-80 Apdo. 430 E-08190 Sant Cugat del Valles (Barcelona) Phone: +34 (0) 93 / 5653131	Spain
Mitsubishi Electric Europe B.V. 25, Boulevard des Bouvets F-92741 Nanterre Cedex Phone: +33 (0)1 / 55 68 55 68	France	Mitsubishi Electric Europe B.V. (Scandinavia) Fjellvägen 8 SE-22736 Lund Phone: +46 (0) 8 625 10 00	Sweden
Mitsubishi Electric Europe B.V. Viale Colonnari 7 Palazzo Sirio I-20864 Agrate Brianza (MB) Phone: +39 039 / 66 53 51	Italy	Mitsubishi Electric Turkey Elektrik Ürünleri A.Ş. Şenfallı Mahallesi Nutuk Sokak No:5 TR-34775 Ümraniye-İSTANBUL Phone: +90 (0)216 / 969 25 00	Turkey
Mitsubishi Electric Europe B.V. Vespugate Business Park, Ballymount IRL-Dublin 24 Phone: +353 (0)1 4198800	Ireland	Mitsubishi Electric Europe B.V. Travelers Lane UK-Hatfield, Herts. AL10 8XB Phone: +44 (0)1707 / 28 87 80	UK
Mitsubishi Electric Europe B.V. Nijverheidsweg 23C NL-3641RP Mijdrecht Phone: +31 (0) 297 250 330	Netherlands	Mitsubishi Electric Europe B.V. Dubai Silicon Oasis United Arab Emirates - Dubai Phone: +971 4 3724716	UAE
Mitsubishi Electric Europe B.V. ul. Krakowska 50 PL-32-083 Balice Phone: +48 (0) 12 347 65 00	Poland		

## Representatives

GEVA Wiener Straße 89 A-2300 Baden Phone: +43 (0)2252 / 85 55 20	Austria	Electrobit OÜ Põlva mnt. 163 EST-11317, Tallinn Phone: +372 6518 140	Estonia	INTEHSIS SRL bld. Inaia 23/1 MD-2060 Kishinev Phone: +373 (0)22 / 66 4242	Moldova	000 "CSC-AUTOMATION" 4-8, M. Raskovoy St. UA-02660 Kiev Phone: +380 (0)44 / 494 33 44	Ukraine	CEG LIBAN Cebaco Center/Block A Autostrade DURA Lebanon-Beirut Phone: +961 (0)1 / 240 445	Lebanon
OOO TECHNION Prospekt Nezavisimosti 177-9 BY-220125 Minsk Phone: +375 (0)17 / 393 1177	Belarus	UTEKO A.B.E.E. 5, Marogorosus Str. GR-18542 Piraeus Phone: +30 (0)211 / 1206-900	Greece	Fonseca S.A. R. João Francisco do Casal 87/89 PT-3801-997 Aveiro, Esigueira Phone: +351 (0)234 / 303 900	Portugal	ILAN & GANISH Ltd. 24 Shenkar St., Kiryat Arze IL-49001 Petah-Tikva Phone: +972 (0)3 / 922 18 24	Israel	ADROIT TECHNOLOGIES 20 Waterford Office Park 189 Witkoppen Road ZA-Fourways Phone: +27 (0)11 / 658 8100	South Africa
INEA RBT d.o.o. Stepne 11 SI-1000 Ljubljana Phone: +386 (0)1 / 513 8116	Bosnia and Herzegovina	MELTRADE Kft. Fertő utca 14. HU-1107 Budapest Phone: +36 (0)1 / 431-9726	Hungary	Sirius Trading & Services Aleea Lacul Morii Nr. 3 RO-060841 Bucuresti, Sector 6 Phone: +40 (0)21 / 430 40 06	Romania	GIRIT CELADON Ltd. 12 Haomanut Street IL-42505 Netanya Phone: +972 (0)9 / 863 39 80	Israel		
AKHNATON 4, Andrej Ljapchev Blvd., PO Box 21 BG-1756 Sofia Phone: +359 (0)2 / 817 6000	Bulgaria	TOD Kazpromavtomatika Ul. Zhambyla 28 KAZ-100017 Karaganda Phone: +7 7212 / 30 10 00	Kazakhstan	INEA SR d.o.o. Ul. Karadortjeva 12/217 SER-11300 Smederevo Phone: +386 (0)26 / 461 54 01	Serbia	SHERF MOTION TECHN. Ltd. Rehov Hamekava 19 IL-58851 Holon Phone: +972 (0)3 / 559 54 62	Israel		
INEA CR Lisopljaka 4 a HR-10000 Zagreb Phone: +385 (0)1 / 36 940 - 01 / -02 / -03	Croatia	OAK Integrator Products SIA Rītasmas iela 23 LV-1058 Riga Phone: +371 67842280	Latvia	SIMAP SK Jāņa ierka 1671 SK-911 01 Trenčín Phone: +421 (0)3 743 04 72	Slovakia				
AutoCont C.S. S.R.O. Kaňkova 1853/3 CZ-702 00 Ostrava 2 Phone: +420 595 691 150	Czech Republic	Automatiks Centras, UAB Neries krantinė 14A-101 LT-48397 Kaunas Phone: +370 37 262707	Lithuania	INEA RBT d.o.o. Stepne 11 SI-1000 Ljubljana Phone: +386 (0)1 / 513 8116	Slovenia				
HANS FOLSGAARD A/S Theiligaards Torv 1 DK-4600 Køge Phone: +45 4520 8600	Denmark	ALFATRADE Ltd. 99, Paola Hill Malta-Paola PLA 1702 Phone: +356 (0)21 / 697 816	Malta	OMNI RAY AG Im Schölli 5 CH-8600 Dübendorf Phone: +41 (0)44 / 802 28 80	Switzerland				

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## Mitsubishi Electric Europe B.V.

FA - European Business Group  
Mitsubishi-Electric-Platz 1  
D-40882 Ratingen Germany  
Tel.: +49(0)2102-4860 Fax: +49(0)2102-4861120  
info@mitsubishi-automation.com  
https://eu3a.mitsubishielectric.com

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