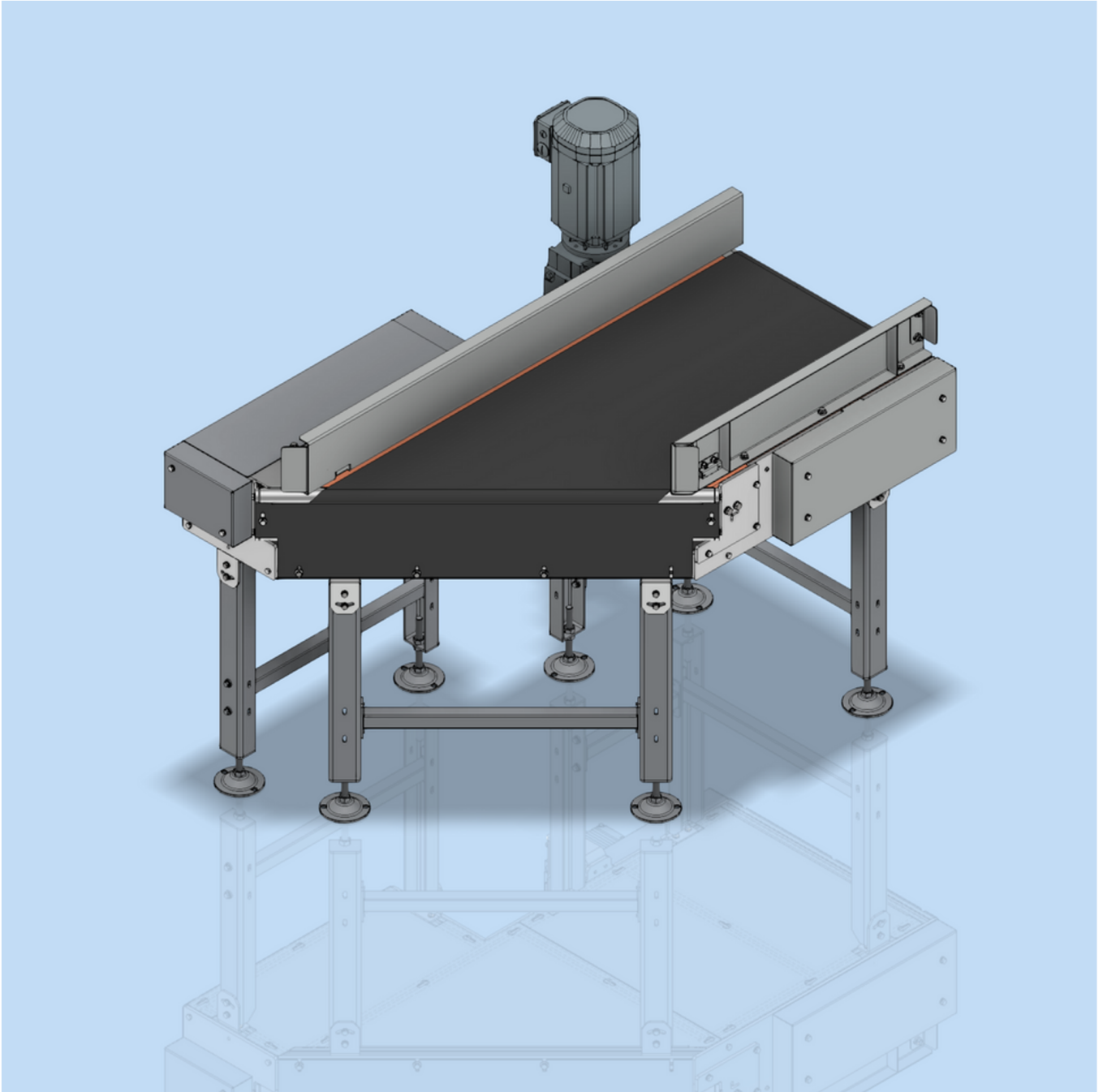


KM 160 & KD 160 Full Belt Merge & Divert

Technical Sales Brochure



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Introduction

1.1 Purpose of this document

In this Operation, Maintenance, Technical & Safety Manual, we give the operator appropriate instructions for the safe and proper operation together with instructions for installation in which contain information enabling you to correctly integrate the machine supplied as partly complete machinery as defined by EC Machinery Directive, in an assembly with other machines and to put it into operation in compliance with its intended use.

It is suggested that all personnel involved with the transportation, assembly, start up, operation, maintenance, upkeep and repair of our curve belt conveyor and accessories, should read and understand this operating, technical and safety manual prior to the commissioning. Become thoroughly familiar with the machine and its controls. In addition, KAIROS CONVEYOR SDN BHD offer technical training sessions upon request.

In order to avoid operating error and to guarantee trouble-free operation of our products, this Technical, Safety Operating & Maintenance manual should always be available all personnel involved.



This manual is intended to inform the buyer / installer / operator & maintenance personnel of the correct installation, safe start-up and operation, maintenance, and any subsequent repair work as and when required.

If the information or instructions are at any time not understood, or it is believed that more information is required, please contact KAIROS CONVEYOR SDN BHD directly before proceeding.

The unit is supplied as ordered, and configured to run optimum to the specifications given. It is advised to consult with KAIROS CONVEYOR SDN BHD for advice on recommended procedures before carrying out any changes, extensions or alterations to the curve, to ensure warranty is maintained.

The information given in this instruction manual is up-to-date at the time of printing and are made according to the best of our knowledge. Within the context of further development, technical changes may be made without notice.

The design and assembly of all KAIROS conveyors are essentially identical, regardless of centerline lengths and widths. As such, the specifications, illustrations and descriptions in this manual may not be relevant to the actual unit delivered, and should serve only for information purposes.

The KAIROS conveyors are constructed according to recognized current health & safety guidelines, however, as with all moving machinery, risks to the user and/or damage to the curve can occur, if the conveyor:

- is not correctly installed,
- is not operated by trained personnel,
- is not used in accordance with regulations,
- is not maintained, or maintained incorrectly

Warranty

1.2 Warranty

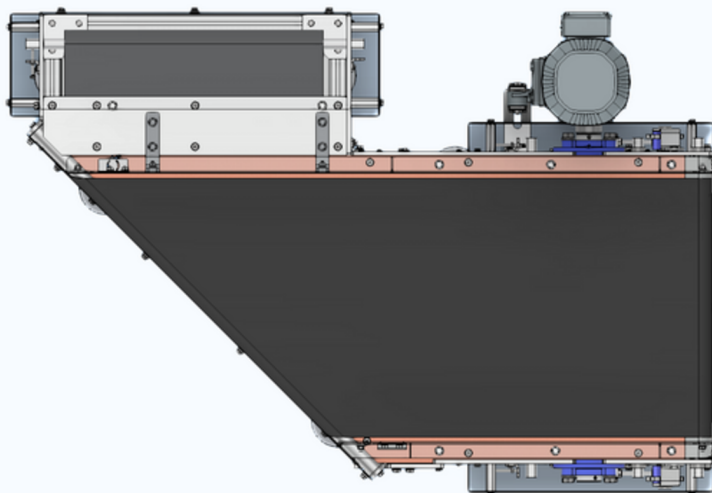
We accept no liability for defects or damage caused by improper handling, operation or maintenance. We expressly point out that only original spare parts and accessories approved by KAIROS CONVEYOR SDN BHD may be used. Unless otherwise stipulated in the contract, the warranty period begins on the day of delivery or with notification of supply readiness.

Please file all claims under warranty immediately after ascertaining the defects. State the order, project and item number. Warranty is offered exclusively in accordance with the legal stipulations. Claims above and beyond this cannot be accepted. Please note that the warranty is rendered null and void in the case of, for example:

- Improper use.
- Incorrect connections and prior installations which do not form part of our scope of supply.
- Incorrect application of control systems.
- Failure to use original spare parts and accessories.
- Conversions or structural modifications without first obtaining KAIROS written approval.



All wear parts are excluded from the warranty.



Safety

At Kairos, SAFETY is our number one priority.

The following information provides guidelines for safety when using our conveyors.

Any piece of machinery can become dangerous to personnel when improperly operated or poorly maintained.

All employees operating and maintaining KAIROS conveyors should be familiar with its operation and should be thoroughly trained and instructed on safety.

Most accidents are preventable through safety awareness.

2.1 Operating conditions

The conveyor, subsequently referred to as the machine, is partly complete machinery as defined by the EC Machinery Directive. The machine has been manufactured in keeping with current scientific and technological developments.

Nevertheless, there may be dangers arising from the machine under the following circumstances:

- Use other than for its intended purpose
- Improper use
- Impermissible operating conditions
- Failure to follow these instructions
- Failure to comply with the general safety regulations during transport and installation

2.2 Intended Use

The machine illustrated on the front page is approved solely for the purpose of transporting unit loads corresponding to requirements defined in the performance specification and is intended to be integrated in a fully automatic intra-logistic system with a master controller.

Use other than or use that goes beyond that specified is deemed as not for its intended purpose and is therefore prohibited.

Never use the machine to transport persons.

It may only be used in a protected industrial environment with restricted access.



The manufacturer accepts no liability for damage arising from improper use of the machine.

2.3 Impermissible operating conditions

Do not operate the machine under the following conditions:

- When there are people or objects in the hazardous areas
- If safety devices are not working or have been removed
- If the machine is malfunctioning or damaged
- If maintenance intervals have been exceeded.
- If operating parameters have been changed without authorization.

2.4 Safety Guidelines

It is very important that all necessary measures have been implemented in order to avoid an unsafe or hazardous condition. KAIROS CONVEYOR SDN BHD does not install the conveyors. It is the responsibility of operating company / integrator for planning and implementing appropriate measures.

Minimum Provisions

1. The installation are made as a complete machine with functioning and compliant safety devices.
2. The integration of the conveyor into the system in such a way that no additional danger / hazards are created.
3. Only operate the machine when it is fully functional.
4. Conveyors shall not be operated unless all covers and/or guards for the conveyor and drive unit are in place. If the conveyor is to be opened for inspection cleaning, maintenance or observation, the electric power to the motor driving the conveyor must be **LOCKED OUT/TAGGED OUT** in such a manner that the conveyor cannot be restarted by anyone; however remote from the area, until conveyor cover or guards and drive guards have been properly replaced.
5. Ensure that these instructions are complete, in legible condition and accessible to all personnel at all times.
6. Ensure that all work on the machine is carried out by qualified and authorized personnel.
7. Always operate conveyor in accordance with these instructions and those contained on the caution/safety labels affixed to the equipment. Understand the equipment safety labels and heed them.
8. Make sure all operators are familiar with the safety equipment.
9. Ensure that the machine and its surroundings are always tidy and clean.
10. Provide safety equipment for operating personnel.

- 11. When working on or around all equipment, avoid wearing loose clothing, jewelry, unrestrained long hair, or any loose ties, belts, scarves or articles that may be caught in moving parts. Keep all extremities away from moving parts. Entanglement can cause death or severe injury.**
- 12. Wear the appropriate personal protective equipment for the job to be performed (examples: eye protection, hearing protection, gloves, safety shoes, hard hat). Ensure that nothing you are wearing could get caught in the machinery.**
- 13. Any machine with moving parts and/or electrical components can be potentially dangerous no matter how many safety features it contains. Stay alert and think clearly while operating or servicing the equipment.**
- 14. Provide instructions on how to proceed and behave in the case of accidents and emergencies.**
- 15. Define issues relating to occupational health and safety as well as environmental protection.**
- 16. Do not operate machinery if you are fatigued, emotionally distressed or under the influence of drugs or alcohol.**
- 17. Know where FIRE EXTINGUISHING EQUIPMENT is located.**
- 18. Know where the FIRST AID SAFETY STATION is located.**
- 19. Never sit or stand on the machine or on anything that might cause you to fall against the machine.**
- 20. Rotating and moving parts are dangerous. Keep clear of the operating area. Never put any foreign object into the operating area.**
- 21. Routine inspections and Preventive and Corrective maintenance programs should be conducted to ensure that all safety features and devices are in place and functioning properly**
- 22. DO NOT clean the conveyor while in operation. Where proper cleaning requires the conveyor to be in motion and a hazard exists, personnel should be made aware of all associated hazards as indicted above and take proper precautions**

Additional Safety Notes:

Disconnecting and locking out the power to the motor driving the unit provides the only real protection against injury. Secondary safety devices are available; however, the decision as to their need and the type required must be made by the owner/assembler as KAIROS CONVEYOR SDN BHD has no information regarding plant wiring, plant environment, the interlocking of the conveyor with other equipment, extent of plant automation, etc.

Other devices should not be used as a substitute for locking out the power prior to removing guards or covers. We caution that use of the secondary devices may cause employees to develop a false sense of security and fail to lock out power before removing covers or guards. This could result in a serious injury should the secondary device fail or malfunction.

Electrical controls, machinery guards, railings, walkways, arrangement of installation, training of personnel, etc., are necessary ingredients for a safe working place. It is the responsibility of the contractor, installer, owner and user to supplement the materials and services provided by KAIROS CONVEYOR SDN BHD to make the conveyor installation comply with the law and accepted standards.

2.5 Safety Symbols in the Manual

Safety precautions are located throughout the equipment manuals to highlight unsafe practices or possible hazards that could result in death, severe personal injury and/or equipment damage. The following symbols are used to direct attention to specific hazards and precautions. Pay close attention to all hazard warnings and their specific avoidance instructions.



DANGER

Indicates a hazardous situation which, if not avoided, **WILL** result in death or serious injury.



WARNING

Indicates a hazardous situation which, if not avoided, **COULD** result in death or serious injury.



CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



NOTICE

Indicates information considered important but not hazard related (EX: messages relating to equipment/property damage).

Failure to follow these warnings could result in death or severe personal injury.

2.6 Safety Labels on the Conveyor

The purpose of safety labels is to draw your attention to equipment and situations that could affect personal or site safety.

The use of safety labels does not replace the need for appropriate accident prevention procedures. Always pay attention to the safety instructions provided on each label.

Each section in the equipment manual lists the safety labels used on that piece of equipment, and includes a diagram of where they are located on the machine as shown below.





WARNING

- Do not alter or remove safety labels.
- Inspect the machine periodically to be certain the appropriate safety labels are in place.
- Replace damaged, worn or missing labels immediately.

Order replacement labels from KAIROS CONVEYOR SDN BHD using the label part number and quantity per unit conveyor as listed below;



Part Number : H00001
Quantity : 1 pc



Part Number : H00002
Quantity : 1 pc



Part Number : H00003
Quantity : 1 pc



Part Number : H00004
Quantity : 2 pcs



Part Number : H00005
Quantity : 1 pc



Part Number : H00006
Quantity : 2 pcs

2.7 System layout

Observe the following basic safety principles when connecting several separate components to form an overall system:

Install guards in areas of pulleys, apex bends, roller arches, conveyor gates and transfer drives. In the vicinity of a transfer drive or a conveyor gate, the belt must have the same speed or run faster in the out-feed area than in the in-feed area.

The national safety regulations valid in the country of use as well as additional sector-specific requirements shall apply.

2.8 Commissioning

This conveyor system is "partly completed" machinery as defined in the Machinery Directive 2006/42/EC, Article 2g. Intra-logistic functionality can only be achieved through the use of a corresponding control system and if necessary other (partly completed) machinery. It must not be commissioned until it has been ascertained that the partly completed machinery which is the subject of this documentation or the machinery into which it is incorporated comply with the requirements of the Machinery Directive.

2.9 Personnel qualification

It is very important that for installation, maintenance and repair work as well as commissioning experienced specialist and qualified personnel are required during the operation.

We recommend that you work only with technical personnel trained and authorized by KAIROS CONVEYOR SDN BHD.

General requirements of personnel who has interaction with the conveyor;

- Qualified and suitable to carry out the work or task required;
- Have access to this Operating, Maintenance, Technical & Safety Manual and be familiar with the protective devices;
- Have read and understood this Operating, Maintenance, Technical & Safety Manual especially the relevant sections relating to their work or task;
- Aware and familiar with the basic industry / occupational health and safety, accident prevention regulations and with sector-specific regulations.

Definition of parties / person related to this document;

Operating Company

The operating company is defined as the organization responsible for deployment of the machine for its intended purpose and having the machine operated by suitable and instructed persons.

Integrator

The integrator installs the partly completed machinery for the operating company and integrates it into a system of machines with a suitable control system and safety technology. (Responsible for ensuring conformity of the overall system).

Operating Personnel

Personnel who are appropriately instructed by the operating company in the:

- Functional and operating procedures for the machine
- Possible hazards arising from improper operating procedures
- Protective devices and measures

Technical Personnel

Are technically qualified and authorized by the operating company to carry out specific tasks such as installation, maintenance and fault elimination. Corresponding training in theory and practice is a prerequisite. The following work is to be carried out by specialized personnel only:

Pneumatic Components

Such work may only be carried out by personnel with specialized knowledge of and experience in handling pneumatic systems.

Electrical Components

Such work may be carried out under the guidance and supervision of an electrician in accordance with the codes of electrical engineering practice.

2.10 Remaining risk

The machine's protective devices offer protection against injury. For some tasks, however, personnel have to enter the danger zone. An element of risk therefore always remains. The following table will enable you to detect and avoid fundamental dangers and hazards. Professional conduct and implementation of the corresponding measures minimize risks.

Danger	Possible Cause	Preventive measure to minimize risk
Risk of fatal injury	Accidental restarting of the machine	During maintenance / repair work: <ul style="list-style-type: none"> • Ensure all equipment is isolated from the power supply. • Secure the pneumatic system against accidental restart. • Understand the LOCKOUT/TAGOUT procedure and use it before inspecting, maintaining, servicing or cleaning the equipment to help prevent anyone from accidentally turning on power to the machine.
	Electricity	During decommissioning: <ul style="list-style-type: none"> • Cut of power supply, • Secure against accidental re-activation of the system.
	Falling or slipping of loads	During transport and installation: <ul style="list-style-type: none"> • Observe the centre of gravity of the machine and the permissible lifting load of the hoists, • Secure the machine and hoists to prevent slipping. • Local rules and regulations for industrial safety shall be observed and applied accordingly.
Risk of Injury	Sharp-edges machine parts / components.	During maintenance / repair work: <ul style="list-style-type: none"> • Be alert and proceed with caution, • Wear appropriate protective clothing.

	Rotating shafts	During adjustment / alignment work: <ul style="list-style-type: none"> • Never reach into rotating parts, • Wear close-fitting protective clothing, • Have one or more other persons assist you.
	Falling machine parts	During maintenance / repair work: <ul style="list-style-type: none"> • Support heavy parts (especially motors) • Never step or reach under loose parts
	Thermal hazard from motor cooling fins.	Before contact / touching: <ul style="list-style-type: none"> • Allow sufficient time for them to cool down. • Wear appropriate thick protective clothing.
Risk of Injury	Conveyed loads / items on the conveyor	Prior to repair work / correction of fault: <ul style="list-style-type: none"> • Observe conveyor operations & system operations. • Always keep your body or any part of your body away from the conveyed loads.
	Crushing when two or more conveyors are interfaced or joined to each other.	Ensure adequate guarding, pinch point protection and safety devices are installed.
Environmental risk	Leakage of conveyor motor lubrication.	During disposal: <ul style="list-style-type: none"> • Collect operating fluid in a suitable container. • Disposal of waste oil, lubricating grease, cleaning agents containing solvents and similar products correctly.

2.11 Protective device

Various protective devices are installed on the machine to prevent arm/leg being drawn in and crushed. These devices are listed below.

It is expressly prohibited to render unserviceable, bypass or remove protective devices. These devices may only be taken off temporarily during maintenance or repair work.

If the purchasing contract specifies that certain protective devices are not included in the scope of delivery, the operating company/integrator must assess the potential dangers in accordance with the Machinery Directive.

Technical Specifications

The following section lists the general specifications or preference items:

Main Dimensions

3.1 Technical data

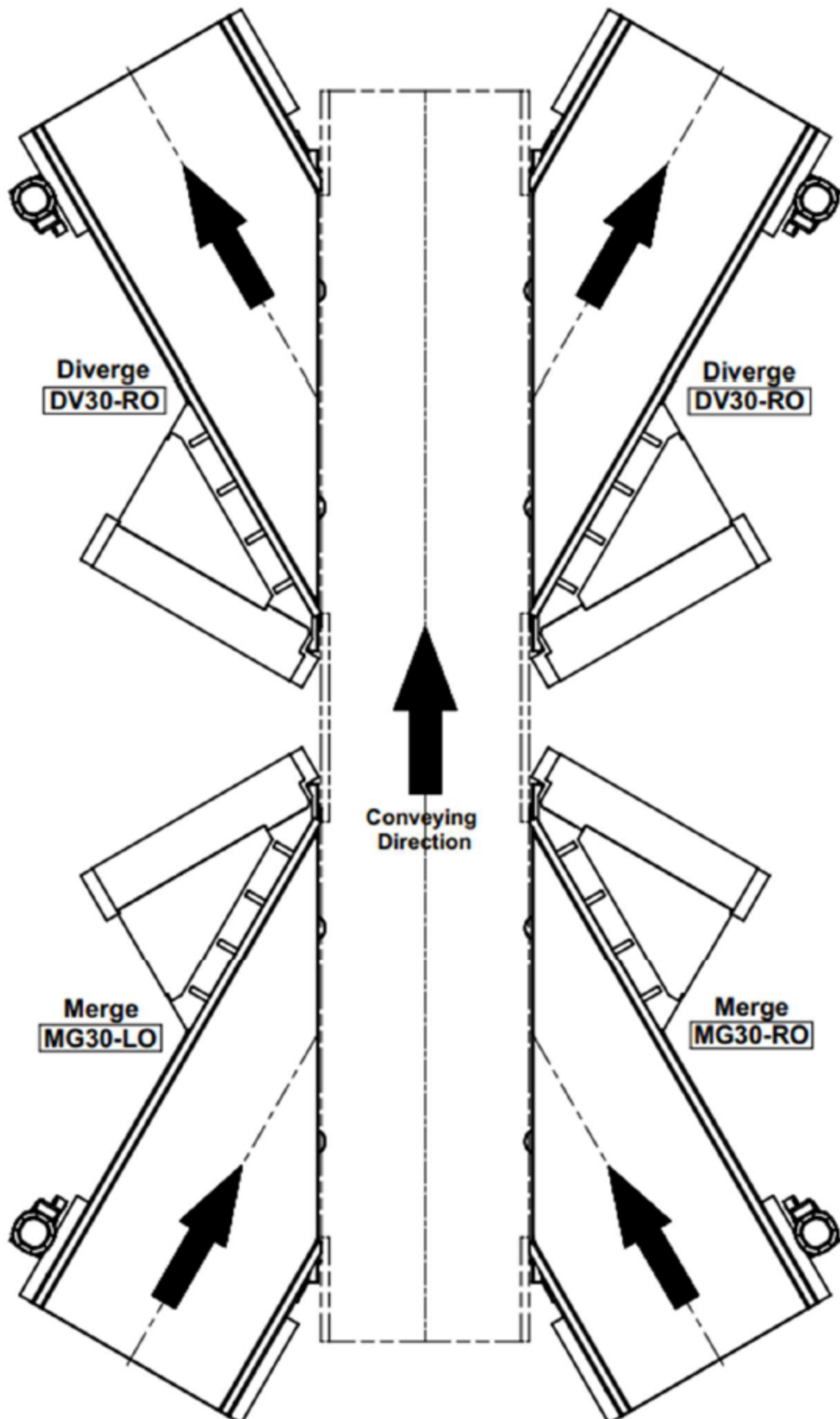
Description	Data
Conveying speed (CLv)	up to 2.0 m/s (centre line)
Safe working load (SWL)	Max. 60 kg/m (depending on conveying speed)
Drive capacity (PN)	0.37 - 3.0 kW, depending on load and speed. (refer to performance specifications or motor type at conveyor's identification plate)

3.2 Mechanical data

Description	Data		
Design versions	Centerline length (LN) Nominal width (WN) Nominal angle (AGL) Conveying height (TOB) (see performance specifications)		
Centerline Length (LN), max.	2400mm		
Centerline Length (LN), min.	AGL (deg) / BG (mm)	30°	45°
	500	1320	1110
	600	1400	1160
	700	1490	1210
	800	1580	1260
	900	1660	1310
	1000	1750	1360
	1100	1840	1410
Nominal width (WN)	500-1100mm		
Nominal angle (AGL)	30° 45°		
Conveying height (TOB), min.	400 mm		
Conveying direction (CD)	MG30-RO MG30-LO DV30-RO DV30-LO MG45-RO		
	MG45-LO DV45-RO DV45-LO		
Conveyor belt type (BT)	PVC Belt with woven fabric inlay		
Drive type (DT)	Shaft Mounted gearmotor		
Deckplate Material (DM)	Flat plywood combi-plate		
Pulley diameter(PD)	160mm		
Frame Construction	Bolted aluminium & mild steel construction		

3.3 Conveyor Configurations

Four configurations of the KM 160 & KD 160 are possible. They are defined as diagram below.



3.4 Electrical data

Description	Data
Motor voltage supply	Standard: 230 V / 400 V AC 50 Hz, for deviations, see motor type identification plate
Motor brake voltage	Standard: 230 V AC / 400 V AC, see motor type identification plate for variations
Protection class	Standard: IP55, not explosion-protected

3.5 Location requirements

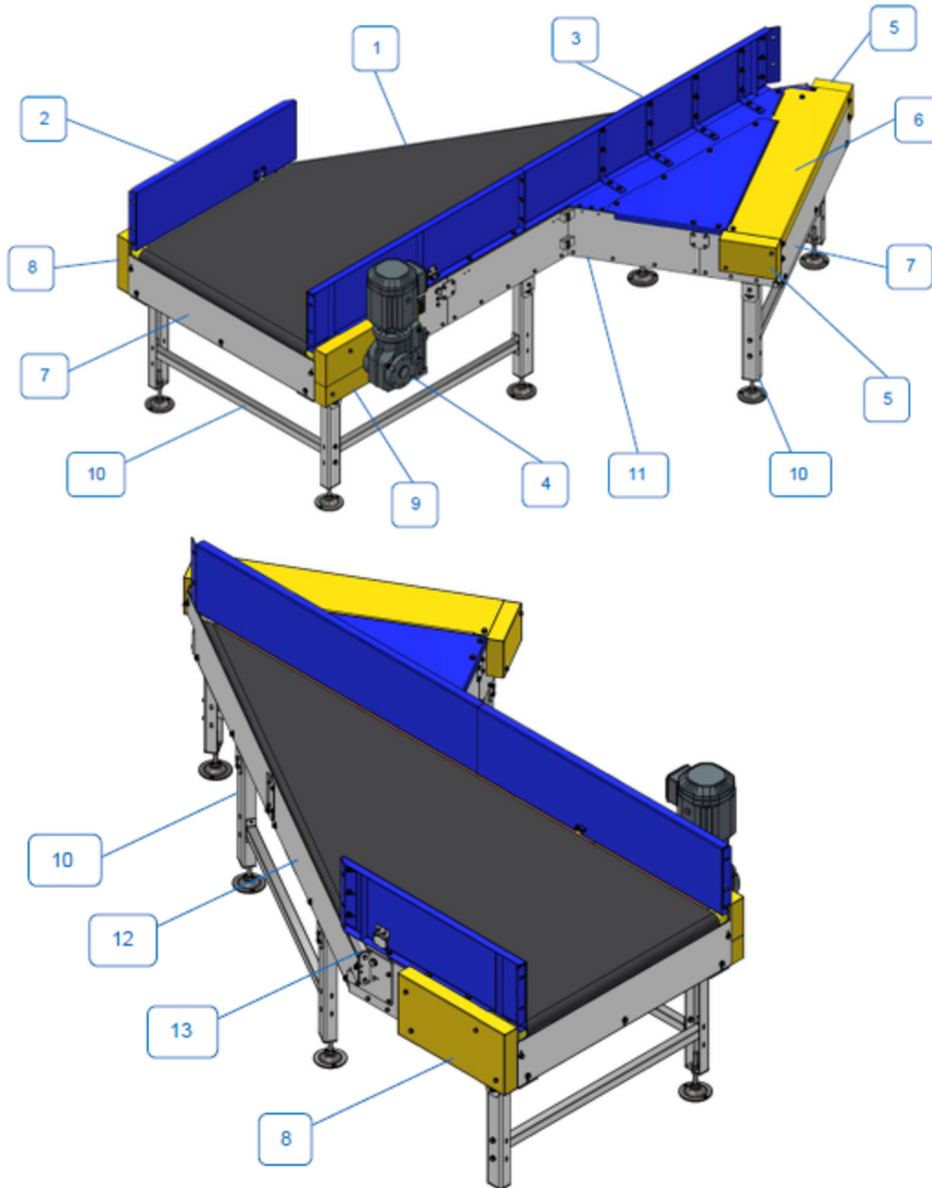
Description	Data
Ambient temperature	+5 to +40 °C, max. 1h up to +50 °C
Relative humidity	max. 80 %
Ambient atmosphere	Normal atmosphere, no explosive atmospheres, does not contain oil or gas, no corrosive components
Installation	In-company - safely protected against precipitation; only stable, screwed to solid ground

3.6 Other data

Description	Data
Year of construction	see type identification plate
Noise emission	The sound pressure level measured in accordance with DIN 45635/part 27 is below 77 dB (A)

3.7 Parts of the conveyor

The conveyor consists of the parts as shown below;



No	Data
1	Belt
2	Sideguard (Short Side)
3	Sideguard (Long Side)
4	Gear motor / Drive Unit
5	Belt Alignment Unit & Cover
6	Belt Return Cover
7	End Cover
8	Left Drive Unit Cover
9	Right Drive Unit Cover
10	Support Leg
11	Frame
12	Front End Cover
13	Nose Bar Unit

SALES & AFTER SALES SERVICE CONTACT

Kairos Global SDN BHD
29, Jalan Teknologi 6
Kawasan Perindustrian Mengkibol
Kluang 86000
Johor, Malaysia

Telephone : +60 7 776 7196
Website : www.kairos-global.com

Should the operation of the curve become hindered in any way, please contact Kairos Global SDN BHD at :

Customer Support : service@kairosconveyor.com
Asia Pacific : +60 13 7200 426
Europe : +44 7836 291 575
Australasia : +61 428 709 840
North America : TBA

For an immediate response, please prepare the following information:

- **Machine model**
- **Project Order number**
- **Conveyor number**