

# GENERAL OPERATION AND MAINTENANCE INSTRUCTIONS FOR INDEX DRIVES

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## GENERAL

The information listed below applies to all models of Packam Controls.



EN ISO 12100:2010

Packam supplies Indexing Mechanisms, Housed Indexing Units without drive and also Housed Indexing Units with drive. Indexer is the term used to signify Indexing, Oscillating or Other motions.

For Indexing Mechanisms (Cam & Turret only), the Customers must have special knowledge in assembly and adjustment of Parallel, Globoidal or Barrel Cam Mechanisms. Packam can provide specific instructions if required. Once a Mechanism is assembled in the customer's machine, it should follow the same maintenance instructions as described below.

Indexers are the most economical way for producing a specific motion that repeats itself time after time and does not need to be changed. The selection of the suitable unit must be done or confirmed by specially trained Packam design engineers to assure the required performance, life expectancy and the safety aspects of Indexers.

Amongst other safety aspects there are two that are listed below of which the customer must be aware.

Under normal conditions, the Indexer needs only a minimum of maintenance. It is important that Packam is advised of the conditions in which the Indexer is used. This enables Packam to account for such conditions and make individual recommendations for installation and maintenance.

In the following instructions, normal operating conditions are assumed.

## SAFETY ASPECTS

Indexers can be heavy and therefore must be handled with the appropriate lifting devices. There are lifting holes provided for use with eyebolts where a crane or similar lifting device must be used.

**DO NOT LIFT THE INDEXER BY HOLD OR ATTACHING ANY LIFTING DEVICE TO THE INPUT OR OUTPUT SHAFTS.**

## INSTALLATION

Although Packam checks all indexers before delivery for dimensions and function, we recommend that the customer also check's the indexer before installation. This is especially recommended for first units used in prototypes and machines where the indexer is difficult to access after the machine is fully installed. Where overlapping motions occur, it is advisable to have a means to rotate the machine by hand allowing a careful check of all motions ensuring no interference could damage the machine or parts of it.

Special care has to be taken when starting the indexer, the first time. Check that the mechanism is at the centre of Dwell period. Ensure that all personnel are out of the danger zone and that the indexing motion can be completed without interference. Special attention should be paid to all overload safety devices and interlocks. Make sure any overload device on the output is set to the correct breaking torque.

It may be that the overload device disengages during the first movement and is not yet hooked up to the supervision, which would signal the disengagement to the machine operator. Any such disengagement could lead to a crash situation because the part to be moved is not in the correct position. Therefore, one must make sure that the overload devices on the output shaft of the indexer are in the correct position.

### 1) LUBRICATION CHECK

Packam indexing units are supplied with and without lubricating oil based on customer selection.

- **IF UNIT IS PURCHASED WITHOUT OIL, SUITABLE OIL MUST BE FILLED BEFORE START.**

The indexers require a premium grade lubricant with Extreme Pressure (EP) additives and preferably Anti-oxidant and Anti-foam additives as well. Packam recommended lubrication oil is:

**Multigrade Hypoid Gear Oil confirming to:**

- SAE 75W-90 EP

- SAE 80W-90 EP

- API GL4 EP

*With EP (extreme pressure) additives and preferably with antioxidant and anti-foam additives.*

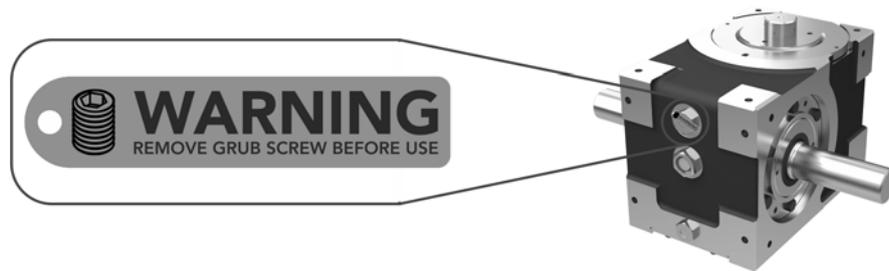
Recommended Brands:



- IF UNIT IS PURCHASED WITH OIL, CHECK & CONFIRM OIL LEVEL IS TO THE REQUIRED MARK.

#### Remove Grub Screw

If indexer is supplied with oil, a grub screw is installed on the breather plug to avoid leakage of lubricant during transport. Before starting operation, remove the grub screw as shown in the sketch below.



The oil level in the housing should be checked periodically to ensure that it is at proper level. Under normal operating conditions the oil should be changed once a year.

### FUNCTION DESCRIPTION

Packam Indexers are pre-loaded table designed to precisely move loads at a predetermined number of stations with zero-backlash. This machine is exactly defined as incomplete machinery that has no specific function / output until incorporated into a complete machine.

#### Continuous or synchronous mode

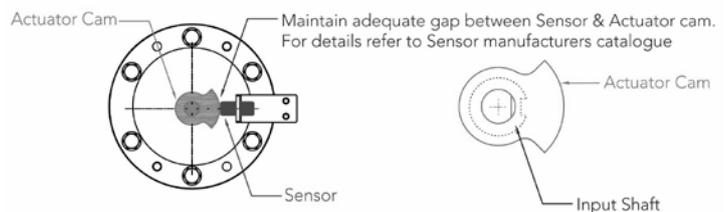
When operating in a continuous mode the brake is released and the motor is started either with a motor starter or with a Variable Frequency Drive (VFD). The VFD is not manufactured by PACKAM. Refer to documentation supplied by the manufacturer for installation instructions. The VFD allows adjustment to the speed of the motor. The output of the indexer is moved intermittently by the internal cam while the motor and camshaft run constantly. The brake can be used to stop the indexer either for a normal stop or emergency stop.

#### Cycle-on-demand mode (Start/Stop)

Cycle-on-Demand consists of single complete 360 degrees turn of the camshaft followed by a stopping of the indexer cam shaft in the middle of its dwell portion. For a Type 2 indexer one complete cycle is one half or 180 degrees turn of the cam shaft. Once all machine operations have completed the cycle is repeated. A VFD cycling drive or brake motor can be used to start and stop the indexer in dwell. A cycle is initiated by an operator or the PLC or by some mode of signalling. The sensor on the unit detects the target on the cam shaft as the camshaft turns into the dwell position. The sensor sends a signal to the PLC/VFD to stop the motor. It may be necessary to advance the mounting position of the sensor to assure the indexer stopping point.

### WORKING CONDITION

The general starting point of the unit will start with the keyway of the input shaft pointing towards the output shaft, where the cam will be in the middle of its dwell portion. Setting the Proximity Sensor is shown below:



### CAUTION

Once in operation an indexer could suffer basically from four overload situations:

#### A. Stopping in mid-index

This occurs when the Mechanism is in motion and the drive unit is stopped either by cutting the power to the drive motor through an emergency stop or a power failure. For this situation the input drive can be equipped with a slipping clutch or similar device that would allow the stopping time to be extended to a safe amount avoiding overload to the drive unit.

#### B. Starting in mid-index

A similar overload can occur if the mechanism is started in the indexing section.

**Note:** Units are supplied with the Mechanism set at mid-dwell to eliminate start up overload.

#### C. Blocked output shaft at motion start

The forces applied to the output shaft cam followers at the beginning of the motion can theoretically be infinite. Typically, this would be the case if there were interfering motions, for example alignment pins in a round table, which must be pulled away before the table can

be indexed. If the indexer is started with the alignment pins still in the table, severe damage to the indexer would be the result. To avoid such damage, it is necessary to add a one-position locking overload device between the indexer and table.

### C. Overload

Overload situation can occur due to multiple reasons: obstruction, jam condition, power failure, e-stop, electronic malfunction, over speeding, over loading, etc...

Overload Clutch are installed to protect the indexing equipment from costly downtime due to overload or jam conditions. These clutches quickly disengaging the drive system which is fitted to Indexers to avoid damage to the equipment. (Not supplied with indexers) The adjustments of overload devices must be such that at normal operation there is no disengagement.

### RUN-IN

For units with input shaft speeds higher than 150 rev/min, it is advisable to run the unit IN for approximately 12 hours at maximum 150 rev/min. Then check the quality of the oil and if judged necessary, change the oil before running at full speed. For slower speeds a smaller run-in of say 6 hrs is still recommended, since the units are tested at the factory on no load conditions only.

During the run-in of the machine the temperature of the indexing unit should be monitored. If the temperature of the housing rises above 70°C Packam should be notified. Temperatures of the housing above 75°C should be avoided as it could lead to damage of the unit if run over a long period at this temperature. Units which are specially built to run at high temperatures are excluded from this remark.

### IMPORTANT FINAL CHECKLIST

1. Unit has no external damage
2. Oil is filled
3. Indexer is in centre of dwell at the time of start / stop
4. All connected drives are well secured
5. All moving parts of the machine are free and are in smooth motion
6. Motor is adequately selected
7. Compare the model selection data with actual data, such as:
  - o Load on indexer
  - o Dial plate dimension
  - o Speed at which indexer will be running
  - o Motor and brake rating
  - o All other application data
  - o Mounting of indexer
8. Run in test is performed

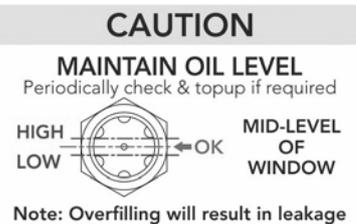
### GENERAL MAINTENANCE

When operated at rated speeds, Packam index drives require virtually zero maintenance.

### PREVENTIVE MAINTENANCE

#### Oil level Check

IDEALLY THE DESIRED OIL LEVEL MUST BE BETWEEN THE MIDDLE LEVEL UP TO THREE FOURTH LEVEL OF THE WINDOW



The nominal oil volumes of standard housed indexers are listed below:

GLOBOIDAL CAM INDEXERS		ROTARY TABLE DRIVES		PARALLEL CAM INDEXERS	
Model No	Litres	Model No	Litres	Model No	Litres
GC50	0.5 L	RT85	1.5 L	PC40	0.5 L
GC80	1.0 L	RT100	2.0 L	PC50	0.5 L
GC95	1.5 L	RT150	3.0 L	PC63	0.5 L
GC110	2.0 L	RT240	12.0 L	PC80	1.0 L
GC140	4.0 L	<b>HEAVY DUTY INDEXERS</b>		PC100	1.5 L
GC150	5.0 L	Model No	Litres	PC125	2.5 L
GC180	7.0 L	HD190	7.0 L	PC160	6.0 L
GC200	15.0 L	HD265	15.5 L	PC200	10.0 L
GC250	18.0 L	HD315	30.0 L	PC250	15.0 L

**NOTE:** Exact quantities will depend on the mounting position of the unit, cam size, etc... Approximate quantities for ordering purpose only are mentioned above.

## Oil Change

An oil change is required every 8000 hours of operation, or every 12 months whichever occurs first. Where operating conditions are severe, such as rapid rise and fall in temperature of the indexer housing (which is accompanied by sweating of the inside walls with a resulting formation of sludge), where operation is in moist and dusty atmosphere and contaminations can be drawn in through the breather plug, or in the presence of chemical fumes, it may be necessary to change the oil in intervals of three to six months.

For heavily loaded units and units that run at speeds higher than 150 rev/min, we recommend changing the oil regularly at intervals of 4000 hours of operation. This means that units must be assembled into the machine with easy access for oil change. There must be a regular check for the correct oil level by the user.

The magnetic drain plug should be visually inspected at oil change time for metallic chips that might indicate failure of one of the internal components.

## REGULAR MAINTENANCE

### Connections

We recommend a periodical check for tightness of all connections on the IN and OUT transmission. Any play on such components would lead to improper performance and possibly early failure of the indexer. Overload devices should be checked regularly for proper disengagement interval depends on the operating conditions. We recommend that this is done at least once per year. Packam recommends that only technicians experienced in index drives maintenance make repairs. That is why all repairs if any are carried out at Packam workshop ONLY. Packam does not provide training or guidance to customer for repairs.

### Cam followers

Cam Followers should be checked every 8000 hours for excessive radial looseness. Cam followers with radial looseness indicate wear and should be replaced immediately. Axial play of the follower outer shell on the stud is normal. If radial play exceeds 0.013mm, the cam followers should be replaced. Cracked or broken cam followers indicate overloading – replace followers and check for malfunction of overload protection. When installing new followers, care should be taken to push only on the centre of the stud head and not on the flange of the stud. The stud should be lubricated and carefully aligned when it is pressed into the hole. Backlash at any station indicates worn or damaged cam followers or cam.

## BREAKDOWN MAINTENANCE

**When operated at rated speeds, Packam index drives require virtually zero maintenance.** However, in case of breakdown, if maintenance is required, the unit must be sent to Packam Workshop for all repairs. It is not advisable or recommended to open the unit at customers end. *[Kindly refer to the Packam sales terms & conditions document available on our website]*

**Kindly direct you Service & Support requirements to [service@packam.co.in](mailto:service@packam.co.in)**

## WARRANTY

Packam Indexers carry a 4 years warranty. *(subject to application requirement & sizing)*

However Open Mechanisms, Customs Cams, Cam Followers, etc., carry 1-year warranty.

*[Kindly refer to Packam warranty and support terms and conditions document available on our website]*

### When and if a problem is detected:

#### IMMEDIATELY STOP USING THE INDEXER

Contact Packam representative - remember to mention the indexer type and serial number in your communication. This will enable Packam to serve you at the earliest.

**Do not attempt to open the unit - warranty shall be void if the unit has been opened, tampered with or modified in any way.**

Note: Packam recommends that only technicians experienced in index drives maintenance make repairs. That is why all repairs if any are carried out at Packam workshop ONLY.

## POST WARRANTY

### When and if a problem is detected:

#### IMMEDIATELY STOP USING THE INDEXER

Contact Packam representative - remember to mention the indexer type and serial number in your communication. This will enable Packam to trace back for spare parts or other reasons in case of end-user requirements.

**A FULL YEAR WARRANTY IS GIVEN ON ANY UNIT REBUILT BY PACKAM.**

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