OPERATION MANUAL
SERIES 10 AND 11

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**OPERATION MANUAL**  
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**Note: Failure to comply with these operation guidelines may affect Warranty.**

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TYNECAT (section 1)  
GENERAL THEORY OF OPERATION  

The TYNECAT is designed to lift and transport long loads into shipping containers. It has a maximum lift of 7 tonne per lifting trolley (there is a minimum of 4 lifting trolleys per unit. 4 x 7 = 28 tonne) and a maximum speed of 30 metres per minute.

The front and rear lifting trolleys have hydraulic steering to control the load positioning relative to the container wall. The front and rear trolleys operate independently to give more accurate and faster steering response.

The TYNECAT is controlled by an on board computer. The steering sensors inform the computer on how far or near they are to the container wall. In automatic mode the computer then decides which steering response is required to keep the load at the correct distance from the container wall. The computer also controls the lights on the visual monitor. This monitor tells the operator where the load is positioned in relation to the container wall. (See section 4 for more details) In manual mode the visual monitor will still show load position, but the operator must perform the steering function.

Another electronic device, called an encoder, informs the computer which direction it is travelling and at what speed. This device must be running for the computer to respond to any steering function in automatic and standard manual steering. (There is an encoder over ride function for emergency manual steering. see section 3 for more details.)

Note: These electronic devices are sensitive to heavy impact forces. Every attempt must be made to protect them.
The lifting trolleys have a hydraulic lifting cylinder on each. These cylinders lift the load and **do not** all lift at the same time. The trolley with the least load will raise first, then the next least and so on until all are raised.

All loads must be on suitable pallets to allow the TYNECAT access under the load, to position the load squarely on the TYNECAT and are not to interfere with the steering sensor’s line of sight to the container wall.

**Note:** A visual inspection should be made to ensure the load has raised above the platform and there is no obstruction to the steering sensors. **The TYNECAT must be attached to a forklift, with the park brake on, before any load is lifted.**

The raise (up) and lower (down) press buttons are situated on the hand control box. An alarm will sound when load is up. Hold these buttons down until the computer senses the correct pressure and stops the unit from running. An alarm will sound when the load is down.

Raise and lower functions will operate whenever the machine is switched on.
TYNECAT (section 1)
GENERAL THEORY OF OPERATION

Attaching the TYNECAT to the forklift (3 tonne minimum) is as follows.

Remove push rod pin. 
Install push rod bracket on fork frame.

Attach push rod to frame with push rod pin. The forklift tynes should be in the pockets provided. Generally the TYNECAT will roll easily with no load on it, which helps with aligning pinhole and pin.

The hand control box is found under the visual monitor box lid. Remove the hand control box and feed box and cable to the operator on the forklift. Turn the main power switch to the on position. The TYNECAT should start running to charge the hydraulic system to approximately 2000 psi. The visual indicator box will have some lights on. It is important to check the voltmeter (12 volts or better while machine is not running) and pressure gauge (Above 1000psi).
TYNECAT (section 2)
OPERATOR MAINTENANCE REQUIREMENTS

Maintenance is critical to performance and a long service life. Failure to perform the following could affect warranty.

TYNECAT operators are required to maintain the following at least weekly.

- Hydraulic oil level
- Battery water level
- Battery terminal condition
- Battery must be kept charged to a high level.
- All wheel axle bolts and wheels to be checked and tightened.
- Steering sensors are to be kept clean and occasionally re-set.
- Loading platforms and ramps must be swept clean to prevent roller and encoder damage.

**Hydraulic oil level**

The hydraulic Reservoir is situated in the hydraulic cabinet on the right hand side of the TYNECAT. The sight glass will be either on the front or on the side of the Reservoir. Oil level should be at least half way up the sight glass. Use hydraulics oils. AWH68 oil in warmer climates. AWH46 oil in cooler climates. **WARNING: DO NOT FILL ABOVE SIGHT GLASS.**

**Battery water level and terminals**

In the main cabinet there are two 6-volt batteries connected in series to produce 12 volts. These batteries are deep cycle which give longer running times. However they use a higher volume of water. Slide batteries out and remove filler caps. Push small levers in opposite directions to unscrew.
TYNECAT (section 2)
OPERATOR MAINTENANCE REQUIREMENTS

If the water level is below the bottom of the filler tube on any of the filler holes, they must be filled to the bottom of the filler tube. The use of de-mineralised water is recommended. Check that the terminals are clean and tight. Replace filler caps correctly.

Battery charging.

The battery charger can be switched to the high rate of charge only for short periods, this will reduce charging times. The charger should then be switched to the low rate to complete charging. The new series charger is fully automatic (serial 11591 on).

On the front left of the TYNECAT control tower is a mains power input plug to power the on board charger. Care must be taken to remove this plug before moving the machine.
TYNECAT (section 2)
OPERATOR MAINTENANCE REQUIREMENTS

Steering sensors cleaning and re-setting (teaching)

Steering sensors need to have clean lenses to operate accurately. It is important that these are wiped clean with a soft oil free rag. There are at least two sensors per machine. These sensors are located on both front and rear lifting trolleys, either on the right or left side of the machine.

Occasionally the steering sensors may need re-setting. If load positioning is consistently offset, then re-setting is required. This procedure is as follows. Place the teaching templates (found in the main cabinet) in front of both sensors hard up against the side guard in the lowered position. Ensure the lights on sensor lenses are on but not flashing (If the lights are flashing, the sensor can not see the template. Re-align until the lights stop flashing). Turn the manual/auto switch to manual on the hand control. Depress the teach button, which is in the electrical cabinet, for 5 seconds and the computer will remember this new setting. Switch the hand control back to auto, replace templates in main cabinet and use the pre-loading test in section 7.
TYNECAT (section 3)  
HAND CONTROL BOX

The hand control box is the main item for controlling normal functions such as lifting, lowering, automatic/manual functions and manual steering press buttons. These steering functions will only operate if the encoder is running. IE: The machine is moving. See EMERGENCY manual steering if the encoder is not operational.

Front left press button. (Manual steering only)  
This button will steer the front of the load to the left.

UP press button to raise load

Front right press button. (Manual steering only)  
This button will steer the front of the load to the right.

Rear left press button. (Manual steering only)  
This button will steer the rear of the load to the left

Down press button to lower load.

Rear right press button. (Manual steering only)  
This button will steer the rear of the load to the right.

Manual/automatic switch. This allows the operator to chose between normal manual and automatic steering. Automatic should usually be used unless there is a fault with a sensor or the TYNECAT needs to be positioned off centre for unloading and loading. The encoder must be running.

This switch is for EMERGENCY manual steering only. This is when the encoder is not operating and can not tell the computer the direction of travel. The operator must switch this to the direction of travel. In automatic or standard manual steering this switch does nothing.
TYNECAT (section 3)
HAND CONTROL BOX

STANDARD MANUAL STEERING.

This function is to allow the operator to position the TYNECAT in any position he wishes. This may be required if a load has shifted toward the container wall in transport. The tapered ends on the TYNECAT tynes will assist in positioning when pushed in, but some steering assistance may be required. If the load is not against the container wall, switch to automatic steering when the load is raised and the computer will steer the load back away from the wall and to the pre-set distance. If the load is against the container wall, raise the load and manually steer until it is clear of the wall, then switch to automatic steering. The TYNECAT has to travel some distance before it can steer in automatic, whereas in manual it will steer, at the operator’s request, immediately when travelling.

NOTE: The encoder light must be on when travelling for this function to operate. When stationary the steering will not operate. The encoder light will come on when travelling regardless of steering sensor readings.

AUTOMATIC STEERING.

This function should be used at all times when the load is not against the container wall and the steering sensors and encoder are operating correctly. The computer will carry out all the necessary steering functions. All the operator has to do is watch the visual monitor (See section 4) and maintain a constant low speed.

IMPORTANT NOTICE

The automatic function will **not** operate in the following conditions.

- The steering sensors have a distance range that they can operate in. If there is no object in this range, the computer has no reference to steer from and consequently will not steer at all. This will be indicated by two red lights on the top line and/or bottom line of the visual monitor (See section 4).

- The TYNECAT can not steer when not loaded and in the raised position, as it has insufficient traction on the front lifting trolleys. When lowered and unloaded steering is more affective, but can still slide sideways (See pre-load testing in section 6). When loaded much more traction is on the wheels and steering is at its optimum.
TYNECAT (section 3)
HAND CONTROL BOX

EMERGENCY MANUAL STEERING

This function is to allow the operator to manually steer the TYNECAT when the encoder is not operational. This should only be used in this situation as the direction of steering is reversed from travelling forward to reverse. Usually the computer does this, but it relies on the encoder for the information on direction of travel, so now the operator must give the computer this information via the forward/reverse switch on the hand control box.

If the encoder or any other function is not operating call your service agent immediately.

The emergency manual steering function will operate at all times including the stationary position.
TYNECAT (section 4)
VISUAL MONITOR

The visual monitor is designed to give the operator an indication as to where the load is positioned in relation to the container wall. It also shows that the encoder is running and the hydraulic steering is being activated to steer in the correct direction either automatically or as directed by the operator in manual steering mode. The monitor also has an audible alarm (beeper) which notifies the operator of over speed (Intermittent beep), imminent contact with the container wall (Continuous beep) and that when raising or lowering is complete.

The top row of lights is for the front of the load (First to enter the container). Green lights indicate the load is close to the centre position. The amber lights indicate the load is off centre and a white light (Steering left or right) on the opposite side of the monitor must come on at the same time to indicate the computer is responding and steering the load back to centre. The hand control must be switched to automatic. The bottom row of lights operates exactly the same for rear of the load.

The fork lift operator need only watch this monitor when loading. An observer can advise visual confirmation of load position and distance left to travel. 

Note: When stationary the lights indicate the true distance to the container wall.
TYNECAT (Section 5)

FAULT FINDING

Both red lights on top and/or bottom line.

- Steering sensors are out of range. There is either nothing to see or an object is too close to the sensor. Automatic steering will not operate in this situation. Normal manual steering will operate when the machine is travelling and must be used to position the TYNECAT so that the sensors are in range.

Both outside amber lights are flashing on the top row.

- The hydraulic pump has run for too long. This can be caused by low battery voltage, low oil, accumulator damage, steering or lift cylinder leakage or hydraulic hose failure. Check battery, oil Reservoir and under machine for oil leaks. Call your service agent if anything other than low battery.

Both outside amber lights are flashing on the bottom row.

- The hydraulic pump has been unable to charge the hydraulic system. This can be caused by low battery voltage, hydraulic oil leakage or low pressure switch failure. Check battery, oil Reservoir and under machine for oil leaks. Call your service agent.

Both inside amber lights flashing on the top row.

- The hydraulic oil level is low. Fill hydraulic Reservoir (See section 2). This indicates an oil leak on the machine. Call your service agent.

Both inside amber lights are flashing on the bottom row.

- The hydraulic oil has become too hot. Several internal parts can cause this. Call your service agent.

NOTE: Unauthorised tampering with mechanical, hydraulic or electrical components can affect warranty. A qualified technician must perform all servicing and repairs.
The TYNECAT system requires a platform to support the load at the same height as the container floor. The platform also performs other functions as listed below and on the next page.

The platform has a hinged flap on the container end, which is folded down to allow the TYNECAT to roll smoothly from the platform to the container floor with a minimal amount of force. This flap must be folded up when placing or removing the container. There are feeder brackets attached to outsides of the platform at the container end. These are to align the container to the platform when placing the container.
TYNECAT (Section 6)
PLATFORMS AND SIGHT BOARDS.

Platform flap is folded down to container floor

Centre of container wall aligned with sight board.

Flap folded back

Sight boards

Container must be hard up against the feeder brackets

Container doors must be open before placing on platform.

The side plates of the platform have slots cut in them to support the sight boards. These sight boards are an artificial container wall that the TYNECAT uses to steer the load to the correct position outside the container. This ensures the load is square as it enters the container opening. The sight boards are to be aligned with the centre of the container wall to produce a smooth transition from the sight board to the container wall.

Note: The container doors must be open when placing container on the platform.
TYNECAT (Section 7)
LOADING AND UNLOADING.

LOAD POSITION.

The TYNECAT system requires the correct positioning of pallets under the loads to perform. The loading ramp side plate should have the load (6 and 8 metre), pallet and TYNECAT positions marked clearly to assist in load set up. The pallets and TYNECAT will always be in the same position and only the position of the load end will change.

PALLET POSITION AND DIMENSIONS
Pallets must be positioned near to the centre of the lift trolleys and aligned to allow the TYNECAT easy access for loading and unloading. Misalignment will cause difficulty inserting and removing the tynes. The pallets must also be positioned as close to the centre of the loading platform as possible. Do not try to align the load with the container wall, but align with the pallets. The tyne pockets in the pallets will align the TYNECAT with the pallets and the TYNECAT will steer itself to align the load with the sight board and container wall.

**Important:** When loading loads longer than 8 metres with a twelve metre Tynecat that are going to a port that only has an 8 metre unit pallets must be positioned for both machines. (ref page 21 for details)

**PRE LOAD TESTING.**

It is strongly suggested that before the first load of each day the TYNECAT be tested. This is a simple operation taking very little time.

- Position the TYNECAT on the platform as near to centre as possible and turn on the main switch.

- Lower the TYNECAT by pressing the DOWN press button until the machine stops running.

- Place a small load (500 to 1000 Kg) across the front (nearest to the container) tynes to give the lifting trolleys some traction.

- Switch the machine to AUTOMATIC and push the TYNECAT into the container. When the centre green lights only are on the top and bottom rows, stop and compare the distances from each tyne to the inside flat of each side on the container wall. Do this for both front and rear lifting trolleys. These distances should be within 10-15 mm of each other.

- If the above is successful commence loading. If the positioning is incorrect use the teaching procedure on page 8.
LOADING PROCEDURE.

- Place the load on the platform with the pallets in the correct positions.

- Switch the TYNECAT ON and insert under the load, in the DOWN position, until the machine reaches it’s position marked on the platform.

- Press the UP button until the TYNECAT stops running. Check visually that the load and pallets are clear of the platform and that nothing is interfering with the steering sensor’s line of sight to the wall.

- Ensure the hand control is in the AUTOMATIC position and the forklift tynes are in the pockets. Tilt the forklift tynes back to take some weight of the load. This is to give the drive wheels on the forklift more traction.

- The forklift operator is only required to try to keep a constant speed and to watch the VISUAL INDICATOR to ensure the load is being positioned correctly. DO NOT ATTEMPT TO STEER WITH THE FORK LIFT. An observer should be used for a visual check on position and to advise when the load is in the container. If any of the red lights on the VISUAL MONITOR come on stop immediately and investigate.

- When the load is positioned in the container, press the DOWN button until the machine stops running and slowly remove the TYNECAT from under the load. Continue slowly all the way back to allow the steering system to keep the machine aligned for the next load.

UNLOADING PROCEDURE.

This is the reverse of the loading procedure with the following additions.

- An inspection of the load must be done to check the position of the load (it may have shifted in transport) and the length of the load. This is important to identify whether the TYNECAT must be manually steered in and how far to insert the machine so that the pallets are on the lifting trolleys.

- If the load is against the container wall the operator must manually steer the load off the wall. Once the load is off the wall the operator can switch back to the automatic steering system.
TYNECAT (Section 8)
STORAGE AND TRANSPORT

The SERIES 11 8 metre TYNECAT is supplied with lifting eyes, which can be found under the top lid or inside the main cabinet. These are screwed into the tyne top plates. The machine can be lifted with a 3 tonne forklift as shown above. Ensure the push rod is in the upright position and pinned, as this will raise the ENCODER up into the main cabinet out of harms way. 12 metre units must be lifted from underneath and either side of the rear trolleys using an appropriate sized forklift.

When storing the TYNECAT ensure the MAIN ON/OFF switch is turned OFF. If the machine is left ON the on board computer will keep charging the hydraulic system and will damage the batteries. Every attempt must be made to ensure the steering sensors are kept clean and battery water level is correct.

When transporting the TYNECAT by container or general freight the tynes must be supported so the trolley wheels are not in contact with the ground. This will prevent the TYNECAT from rolling in transport. An easy way to do this is to raise the trolleys and slide timber under the tynes and lowering the trolleys. This will lift the trolley wheel above the ground.