

## LnTOR-D7



5-50kW



65-145kW



185-265kW

- 36 Digital and Analog I/O combinations
- Unique, inbuilt shaft position controller
- Intelligent overload protection
- Large 40 character alpha-numeric display
- Inbuilt Configuration Checker
- Ultra compact size - Less panel space
- The most powerful Digital DC drive in the market today

— The technology DC Drive with features that excite...



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## About us

L&T AUTOMATION was first to introduce an indigenously developed DC Drive in 1971 and since then have been catering to continuously changing industry needs. It has been our endeavour to provide customers with high performance, innovative products and systems solutions with excellent technical specifications and reliability.

L&T AUTOMATION now offers *LnTOR-D7* a world class Digital DC Drive with exciting features utilising the best technologies. It is backed up by highest quality of engineering support and customer service, the hallmark of L&T AUTOMATION.

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## LnTOR-D7

The *LnTOR-D7* is the most powerful digital DC Drive in the market today.

Available in two quadrant and four quadrant versions, the range comprises of three very compact chassis sizes with models rated from 5 to 265kW. For larger ratings, the 'powerstack' and 'stack driver' come in cabinet construction.

With an extensive suite of standard application blocks, it can take control of the most demanding motion tasks. All models include large 40 character alpha-numeric back-lit display, full set of centre winding macros and a field weakener for extended speed range. A high quality product from a company, which has known DC Drives for over 30 years.

### Key Features that excite

- Three fully independent, user programmable drive configurations.
- PL PILOT drive configuration and monitoring software cuts short start-up/commissioning time.
- Extremely flexible block diagram including unique 'Configuration Checker', detects shorting of output connections of user programmed block diagram.
- In depth diagnostic facility available from on board display and 'in-built meter'.
- Programming menu designed for rapid travel to desired parameter using ergonomically designed keys.

We have to our credit over 25 years of experience in providing total solutions. Our domain knowledge revolves around:



- Friendly, easy to use menu structure with plain English parameter names eliminate need for look-up tables.
- Five feedback transducer options as standard.
- Built in 'oscilloscope' output for full parameter monitoring.
- Non-volatile trip alarm memory, even after power-down.
- Extensive, multi-function programmable I/O, with over 36 digital & analog input/output combinations.
- Unique electronic regenerative stopping facility on some two quadrant models.
- On board fully controlled field with five operating modes.
- Serial communications to allow off site programming and remote diagnostics.
- Ultra compact sizes offer significant panel space saving over others.
- Unique, inbuilt shaft position controller enables accurate positioning of motor shaft.
- Inbuilt Intelligent overload protection available.



# LnTOR-D7 Digital DC Drive



LARGE 40 CHARACTER BACKLIT ALPHANUMERIC LCD DISPLAY

EASY TO USE MENU STRUCTURE WITH ENGLISH LANGUAGE PARAMETER NAMES

## Rating & dimensions

PL 2 QUADRANT PLX 4 QUADRANT		kW @ 460V	HP @ 460V	Armature Current * DC Amps @ 50°C Ambient	Field Amps	Frame Size (H x W x D mm)
PL and PLX	5	5	6.6	12	8	
PL and PLX	10	10	13.3	24	8	
PL and PLX	15	15	20	36	8	
PL and PLX	20	20	26.6	51	8	289 x 216 x 174
PL and PLX	30	30	40	72	8	
PL and PLX	40	40	53.3	99	8	
PL and PLX	50	50	66.6	123	8	
PL and PLX	65	65	90	155	16	
PL and PLX	85	85	115	205	16	410 x 216 x 218
PL and PLX	115	115	155	270	16	
PL and PLX	145	145	190	330	16	
PL and PLX	185	185	250	430	32	
PL and PLX	225	225	300	530	32	505 x 216 x 294
PL only	265	265	350	630	32	

LnTOR-D7DC drives are remarkably compact, so further savings in terms of cabinet size, ease of machine installation and wiring. These substantial savings can often outweigh the initial cost of the product itself.

Ease of use is another benefit. Product manuals offer step by step start-up guidance and contain all the technical details required - examples of typical applications are provided making system design quick and trouble free.

## LnTOR Stack Driver

\* For large rating drives, 'powerstack' and 'stack driver' are integrated in cabinet to offer tailor made solution. L&T AUTOMATION have supplied large rating drives upto 3500kW designed to handle critical application in continuous process plants.



## Specification



### Ratings

#### Power Configuration

- ◆ PLX Four Quadrant Regenerative
- ◆ PL Two Quadrant Non-Regenerative
- ◆ Some PL models have electronic regenerative stopping facility
- ◆ Fully controlled variable field supply

#### Armature Voltage

- ◆  $V_{\text{armature}} = V_{\text{ac}} \times 1.2$

#### Armature Current Ratings

- ◆ 12, 24, 36, 51, 72, 99, 123, 155, 205, 270, 330, 430, 530, 630 Amps
- ◆ Overload 150% for 25 seconds

#### Field Current

- ◆ 8A (12-123A ratings)
- ◆ 16A (155-330A ratings)
- ◆ 32A (430-630A ratings)

#### Field Voltage

- ◆  $V_{\text{field}} = 0$  to  $0.9 \times$  Auxiliary AC Supply

#### AC Supply Voltage

- ◆ Main 3 phase 50-60Hz :-  
12 to  $480V_{\text{ac}} \pm 10\%$ \* for armature power
- ◆ Auxiliary 3 phase 50-60Hz:-  
100 to  $480V_{\text{ac}} \pm 10\%$  for field power
- ◆ Control 1 phase 50-60Hz:-  
110 to  $240V_{\text{ac}} \pm 10\%$  for control power

\* For supply voltages higher than  $480V_{\text{ac}}$ , please consult L&T AUTOMATION representative.



### Steady State Accuracy

- ◆ 0.01% Encoder feedback with digital reference
- ◆ 0.1% Analog tachogenerator feedback
- ◆ 2% Armature voltage feedback
- ◆ 0.01% Encoder + tacho, encoder + AVF or encoder only feedback
- ◆ Maximum encoder frequency 100KHz



### Protection

- ◆ Interline device networks
- ◆ High energy MOV's
- ◆ Instantaneous overcurrent
- ◆ Field failure & overcurrent
- ◆ Motor overtemperature
- ◆ Thyristor stack overtemperature
- ◆ Mains supply phase loss
- ◆ Mains synchronisation loss
- ◆ Armature overvoltage
- ◆ Speed feedback failure
- ◆ Stall protection
- ◆ Standstill logic
- ◆ Thyristor 'trigger' failure
- ◆ Digital output short circuit



### Inputs/Outputs

#### Analog Inputs - (8 Total - resolution 5mV+sign)

- ◆ All configurable
- ◆ All have programmable thresholds and 4 voltage ranges  $\pm 5/10/20/30V$
- ◆ All inputs are over voltage protected (can also be utilised as digital i/p's)

#### Analog Outputs - (4 Total - resolution 2.5mV+sign)

- ◆ 1 armature current output
- ◆ 3 configurable
- ◆ All outputs are short circuit protected

#### Digital Inputs - (17 Total)

- ◆ All configurable

#### Digital Outputs - (7 Total - max 32V - 350mA total)

- ◆ Short circuit, overtemperature and overvoltage protected
- ◆ All configurable



### **Standard Software Functions**

- ◆ Full suite of centre winding macros
- ◆ Motorised pot simulator with memory
- ◆ 2x PID's (undedicated)
- ◆ 2x Summers (undedicated)
- ◆ 2x Filters (undedicated)
- ◆ Delay timer
- ◆ Current Profiling
- ◆ Spindle Orientation
- ◆ Jog/Crawl functions
- ◆ Dual motor swap
- ◆ Latch
- ◆ Linear or S ramp
- ◆ Slack take up
- ◆ Batch counter
- ◆ Draw control
- ◆ Auto self-tune current loop
- ◆ 3 user programmable drive configurations



### **Alarm Status**

- ◆ First fault latched and automatically displayed
- ◆ Fault automatically saved at power off



### **Standards**

- ◆ **C** **E** marked to EN50178 (low voltage directive)
- ◆ EN50082-2:1995 immunity industrial environment
- ◆ EN50082-1:1997 immunity residential commercial and light industry
- ◆ EN50081-2: 1993 emissions industrial environment (EN55011 Class A)
- ◆ EN50081-1: 1992 emissions industrial environment (EN55022 Class B)



### **Field Configurations**

- ◆ Fixed current
- ◆ Fixed voltage
- ◆ Field weakening
- ◆ Delayed quenching
- ◆ Standby field value
- ◆ Field economy



### **Environment**

- ◆ Ambient Operating Temperature 0-60°C (all ratings)
- ◆ Storage Temperature -25 to +60°C



### **Monitoring**

- ◆ All analog input voltages
- ◆ All digital input states
- ◆ All analog output voltages
- ◆ All digital output states
- ◆ Tachogenerator voltage
- ◆ Motor armature current
- ◆ Motor field current
- ◆ Motor armature voltage
- ◆ Output power
- ◆ AC supply voltage



### **Networking Options\***

*LnTOR-D7* offers host of networking options for integrated drive systems. Multiple drives could be connected on multi-drop network to facilitate simultaneous monitoring/programming.

\*Can be offered on enquiry.



## Configuration & Diagnostic Software - PL PILOT

The PL PILOT is highly intuitive 'Windows' based graphical configuration and diagnostic tool for use with the range of *LnTOR-D7* digital DC drive.

It greatly simplifies drive programming, installation and commissioning. Allows user to tailor the drives control strategy to exactly meet the demands of the process or application.

### Key Features

- Allows on-line and off-line drive configuration
- Allows 'copy and paste' of entire recipes or sections of recipes to improve speed and ease of drive set up
- Custom page allows users to select up to 16 parameters, displayed in bar graph or panel meter format
- Tile and zoom facility allows user to view and arrange any number of screens simultaneously
- Diagnostic monitoring in engineering units (Volts, Amps, kW, Rpm, Hz) and percentages for all terminals and block outputs
- Extensive colour dynamics to assist in the detection of important conditions
- Built in interactive help pages
- Intuitive to use
- Minimises drive set up and commissioning time
- Allows real time parameter diagnostics and monitoring
- Unique Configuration Checker automatically scans for user programmed connection faults and highlights the conflicts
- The layout of the diagram pages and soft buttons mimic the drives menu structure



### The Bar Sub-menus

Second Level shows the four main menu bars on the PL PILOT entry page. These are:

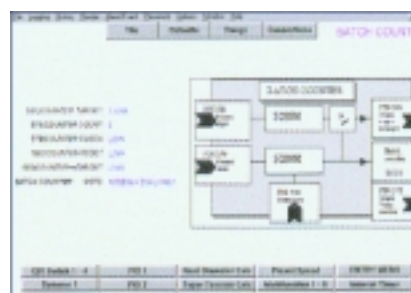
- Change parameters
- Diagnostics and ancillary functions
- Application blocks
- Control terminals

Each bar has buttons that allow access to a drive block page.



### The Block Pages

At lowest level each block has its own page which details its default values (shown in blue text) and any altered values (shown in black text) with its own block diagram - in most cases this alleviates the need for a hard copy of the technical manual - an excellent plus point when commissioning on site!



## Control & Automation from L&T

L&T offers system solutions for control, regulation and monitoring. It plans and implements drive controls and automation projects from concept to commissioning.

Spectrum includes system analysis, project planning, hardware selection, application engineering, application software, manufacture, procurement, testing, integration, commissioning, training, spares and after-sales service.

### Applications

#### Iron and Steel \*

- Sponge iron plants
- Blast furnaces/arc furnaces
- Continuous casting plants
- Wire rod mills
- Annealing furnaces
- Cold rolling mills
- Process and finishing lines

#### Cement \*

Plant wide drives, control and instrumentation from crusher to packing.

SPRS for ID, FD fans, classifier fans

#### Paper \*

- Sectional paper machines
- Super calendars
- Slitters
- Rewinders

#### Material Handling \*

- Port - based long conveyers
- Stacker reclaimers
- Bagging plants

#### Food /Sugar \*

- Mill drives
- Centrifuge
- Conveyors
- Fans / Pumps

#### Power \*

- Boiler interlocks, Burner management
- Water treatment
- Coal & ash handling
- Fans / Pumps

\* Exhaustive reference lists are available.



## L&T AUTOMATION

*The way we put it together puts you ahead*

### Range of Equipment

#### Drive Systems based on

- Fully Digital DC Drives - LnTOR-D7
- Neuro vector controlled, LV AC drives with powerpack from Yaskawa Electric, Japan
- 3.3kV/6.6kV vector controlled, 18 pulse MV inverters from Toshiba, Japan
- Slip Power Recovery Systems (SPRS)
- Transformers, motors, control desks, sensors and other electrics

#### Automation Systems based on

- High-end Process Controllers and accessories with full range of I/O modules and panels for plant controls
- Windows® 95/NT based 'Panorama' supervisory colour graphic operator stations, Network hardware and integration
- Programming packages, sensors, instruments, consoles and other accessories





### **Control & Automation**

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