INTER PLANT STANDARD – STEEL INDUSTRY		
IPSS	**PARTICULAR REQUIREMENTS OF ROLLER TABLE VFD DRIVES**	**IPSS: 1-10-042-12**
	CORRESPONDING IS DOES NOT EXIST	

0. FOREWORD

0.1 This Inter Plant Standard has been prepared by the Standards Committee on Electrical Components and Equipment, IPSS 1:10 with the active participation of the representatives of the steel plants, major consulting organizations and established manufacturers of roller table VFD drives and was adopted in October 2012..

0.2 Inter Plant Standards for steel industry primarily aim at achieving rationalization and unification of parts and assemblies used in steel plant equipment and accessories, and provide guidance in indenting stores or equipment (or while placing orders for additional requirements) by individual steel plants. For exercising effective control on inventories, it is advisable to select a fewer number of sizes/types from those mentioned in this standard, for the purpose of company standards of individual steel plants. It is not desirable to make deviations in technical requirements.

1. SCOPE

1.1 This Interplant standard covers the particular requirements of roller table VFD drives used in steel industry. This document shall be read in conjunction with IPSS :1-10-035-12 and shall be applicable for roller table group drives as additional & specific requirements.

2. SPECIFIC DESIGN PARTICULARS:

-IGBT based with sine coded PWM control.

- 4 quadrant, harmonic control defined by IEEE 519-1992(G5/4)
- EMC – to fulfil all immunity requirements and comply to emission EMC level ‘L’ : EN 61800-3 cat C3.
- Safety- IEC-61800-5
- Communication with basic automation system on com-bus. - Group control with individual overload protection.

2.1 Incoming supply:

- ACB/MCCB with ICs :50 kA rating minimum and positive isolation feature.
- Isolation transformer/ line reactor for harmonic & noise suppression. Isolation transformer K factor <4.
- ac line surge suppressor network.

  Line contactor with bypass arrangement in case of VFD failure. (optional as per user requirement)

2.2 Capacity rating:

- Multi-motor drive rated for 150% of summation of rated motor current of all motors fed from the drive, with hot/cold standby provision as specified by indentor.

2.3 Controller:

- V/F software configurable, multi motor.
- Adjustable PWM carrier frequency for 1-16 kHz.
- Multiple programmable stop modes including – Ramp, Coast, dc-brake, Ramp to hold & S-curve.
- Multiple acceleration & deceleration rates.
- dc bus regulation to prevent over voltage trips due to regenerative condition in case of AFE drives.
- Reversible 8/1 range 100% regenerative with extensive electrical braking & quick reversal.
- On board application programme (to be verified).

2.4 Output :

- Voltage-from 0 to rated motor voltage.
- Variation: +/-0.1% with input variation of +10% ,-15%.

- Steady state regulation of +/-0.25% against 100 to 200% load disturbance & +6%,-6% input supply frequency variation.(Input supply may contain line notching & up to 10% harmonic distortion)
- Frequency-Min 6 step set points, resolution: 0.01Hz.
  Reflected Wave- (Max 3.15 times bus voltage or 1600 V) which ever is less, up to cable length of 200m.
- Speed Control Accuracy: +/-0.02%.

2.5 Control Functions:

2.5.1 **Ramp rate**- linear acceleration & deceleration adjustable independently as required from 0 to 1800 sec with remote accessability of Accel/Decel setting through digital inputs.

2.5.2 **Current Limit**- This shall be load dependant & programmable from 0.1 amp to 150 % -200% of drive rated amps. Current limit shall be active for all drive states, accelerating, constant speed & decelerating.

2.5.3 **Ride through**- control logic should be capable of 'ride through' on power outage, of at least 0.5 seconds in duration.

2.5.4 **Over voltage stall**- To prevent faults caused by regeneration during deceleration, over voltage stall shall extend deceleration time when bus level reaches a safe level.

2.5.5 **Dynamic mode change**- On line bump less change from encoder based vector control to encoder less vector control shall be provided.

2.5.6 **Jog** - Jog frequency shall be configured for forward/reverse direction. Jog stop method shall be configurable to coast, controlled deceleration or dc injection.

2.6 Dynamic Braking :

Drive shall have internal in-built IGBT for use as dynamic braking chopper. This shall have capacity to handle 100% regeneration power from output continuously.

2.7 Annunciation:

- All protection/fault shall be annunciated in key pad of the drive/HMI.
- Following additional features shall be provided.
  a. Transformer fault.
  b. Loss of frequency command.
  c. Storage of 16 previous faults in memory in FIFO sequence.
- In addition to annunciation in key pad, a separate annunciation window shall be provided in front door of VFD panel.

2.8 Key Pad:

- Menu navigation
- On line help
- Quick start
- Instrument failure
- File storage
- Monitoring output Voltage, Current, kW, Interlocks
- dc link Volts.
- In case of multiple drive units, provision for
  i) on line/ off line parameter editing,
  ii) Hyperlink help,
  iii) Drive history record.

2.9 Metering & Signalling:

- Provision of Input/output voltage , current, frequency & kW meter in programmable digital display.
- LED indicators for presence of 1. Drive voltage, 2. dc voltage.

2.10 Segregation & isolation:

- Between power & control(Input, Output & power supplies)

- Control cables with removable connectors & EMC screen clamping.
- Power cables with channel guides for segregation & satisfying EMC performance.

2.11 Integrated/ assembled enclosure:

- Shall contain power unit, circuit breaker, and/or bypass unit.
- Shall comply to specified short circuit rating.
- Ensure optimum ventilation & facilitate ready installation.
- Design shall be multi door, sequential access with graded tool aid as follows:

  1st door- No tools: LV access, 2nd door- tool reqd : HV access, 3rd door- sub system access. All subsystems shall be front accessible.

- power terminations shall be oversized & finger safe, IEC labeled, for drive circuit rating and must contain minimum three ground terminal points.

2.12 Heat Load Data:

Drive Heat load data shall be provided by the supplier.