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VLTI Calibrator Tools - Specification Document

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CHANGE RECORD

REVISION	DATE	AUTHOR	SECTIONS/PAGES AFFECTED
	REMARKS		
1.0	14/12/2009	All	All
	First release.		
2.0	23/02/2011	G. Duvert	Appendix B
	Notes 5 and 6 of table changed.		

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1 INTRODUCTION

The purpose of this document is to define the technical details needed in order to setup the tool emerging from the JMMC/ESO collaboration over calibrators.

The development of the joint calibrator tools is foreseen in several incremental steps:

1. In the first step, the JMMC provides ESO with a fixed calibrator list generated once for each instrumental configuration before the beginning of each period.
2. In the second step, the JMMC proposes to set up a web service to collect data related to bad calibrators, and integrate it in our calibrator tool.
3. Further developments (GUI Customization…) will be detailed in future releases of this document.

2 Good Calibrators Catalogue

The algorithms used to harvest good calibrators from CDS databases are extensively described in Bonneau et al. 2006.

All values included in the catalogue are either:
- flagged with their origins if they were grabbed from CDS catalogues;
- Flagged with their confidence index if SearchCal itself computed them.

2.1 Input Parameters

As the whole process to regenerate the calibrator catalogue takes approximately 1 week, we need to define a schedule to follow each new period. ESO will provide the instrumental configuration for each forthcoming Call for Proposal (CfP) at least 2 months before JMMC should provide a pre-release version of the catalogue. One month is then kept for iterative review of the newly generated catalogue. The total time needed from instrumental configuration to final catalogue delivery is 3 months.

For example:
1. ESO provide the CfP Instr. Conf. description on Sept, 1st;
2. JMMC compute a new catalogue and provide it on Nov, 1st;
3. The final version of the catalogue will be provided by JMMC to ESO on Dec, 1st.

2.2 Output Format

The native file format of SearchCal catalogue is VO Table. VO Tables can easily be converted to, e. g. FITS, using third-party tools like TOPCAT. A list of the JMMC catalogue's raw columns is embedded in 5

Please note that **not** all cells are guaranteed to be fulfilled (blanking values is either empty string/spaces/dash). Confidence index (when available, only on computed values indeed) is a string amongst LOW, MEDIUM and HIGH.

For the time being the catalogue is also provided as a FITS table for ESO convenience. ESO will convert it to its internal format. The precise description of the ESO calibrator catalogue format could be found in the 5 ESO could also split JMMC catalogue in several different ones, according to observing band for example (J, H and K).

2.3 Provided diameters

JMMC catalogue provide one limb-darkened diameter, as SearchCal workgroup expertise affirms that it is sufficient to compute any other band's uniform disk diameter. JMMC provides a document (reference JMMC-MEM-2610-0001) that describes how to compute other 'uniform disk' diameters from its 'limb darkened' diameter.

3 Known Bad Calibrators List

This service should be based on interoperable VO techniques. The bad calibrator list should be widely available through a public web service, using standard VO-compliant query style (initially: cone search. TAP is also considered).

The service will also provide an interface for submission of new 'bad calibrators'. The submission will be moderated, using (as far as possible, and if relevant according to the amount of submissions per year) VO-compliant methods to authenticate people and institutions, thus making such submissions as automated as possible.

The service includes the list of bad calibrators maintained by IAU. Pending an automated synchronisation solution, the moderator[1] is responsible of keeping the list up-to-date with the list maintained by IAU.

This service will be used by the SearchCal engine that will add a ‘bad calibrator’ flag to our catalogue, permitting the end user to drop this object if relevant. By default, bad calibrators hiding will be preferred over deletion, as a bad calibrator for somebody at some wavelength on some baseline may still be of use by someone else.

Furthermore, the bad calibrator flag should only ideally be raised for a given calibrator **and** a detailed instrumental configuration description. But while the process to fully qualify a calibrator as a bad one is still a work in progress, the worst-scenario approach will be used to flag any calibrator found in the bad calibrator list whatever the instrumental configuration it was flagged with.

[1] Dr. Olivier Chesneau has kindly accepted to moderate this service.

4 Forthcoming developments

4.1 Good/Already Observed Calibrators

4.1.1 Good Calibrators

Good calibrators are obtained from CDS database, more precisely from the existing calibrator catalogues (Mérand, Verhoelst etc).

The quality of the calibrator should be flagged in the final FITS table; the exact values of the flag as well as the assigning criteria are to be discussed.

4.1.2 Already Observed Calibrators

In case, the calibrator has been already observed by the VLTI, the link to the instrument specific ESO archive query page will be provided. This page could be also automatically filled in with the calibrator data, and the archive queried. Then, the user will get a list of all the available calibrator files. In the future, the search will be performed on the CALIB_PRODUCT files.

4.2 Plot Generation

The tool has an option to include a link to the calibrator visibility plots, which is only available if the calibrator has been already observed by the VLTI.

4.3 Calvin-like Tool

4.3.1 General description.

ESO/CalVin provides an HTML/Java based interface. The tool is compatible with JavaScript version higher than 1.1. The user is supposed to fill in the entry fields and widgets for the target coordinates and geometry, time of observation and instrument configuration. A "Submit" button sends the parameters to the model executed on the ESO Web server. The final results of the selection are presented in the HTML table. The optional plots are displayed within Java applets allowing interactive manipulation. Certain data are also provided in ASCII and GIF formats for further analysis and printing. Finally, a summary of the input parameters is appended to the result page.

4.3.2 Interface.

Two modes of the tool are available, the Call for Proposal (CfP) mode and the Expert mode. The CfP mode allows the user to search for the calibrators only within the configurations offered for the current observational period. The Expert mode provides the user with a full access to all possible instrument configurations.

The input page interfaces for the Call for Proposal and Expert modes are presented at the pictures below.

VLTI Calibrator Selector

Call for Proposal

Instrument

◉ Midi:	N-Band	Disperser: PRISM	Beam Combiner: HIGH_SENS
○ Amber:	K-Band	Disperser: LOW	Fringe Tracking: NONE

Target Definition

Target Coordinates:

◉ Right Ascension:	6 45 08.9 hr min sec	Declination:	-16 42 58 deg min sec
○ Right Ascension:	deg (decimal)	Declination:	deg (decimal)
○ Target Name:	Target coords found using Simbad Web App		

Magnitude:

Band of Observation:	3.0	
H band:		* AMBER + FINITO only
V band:		* AMBER + FINITO only

Observation Setup

LST:

Start:	Hour: 00	Min: 00		
End:	Hour: 00	Min: 00		

Observatory Location:

◉ Paranal: Latitude: -24.62794830 Longitude: -70.40479659 Configuration: U1 U3 * combination of UT and AT telescopes not allowed	 VLTI Station Positions Click on the image icon for a detailed VLTI map.
Altitude:	Special:
Min. Target Altitude: 15 degrees Max. Sun Altitude: 0 degrees	Time between UV points: 15 mins

User Search Criteria

☑ Angular Dist:	min 0.00	max 25.00	deg			
☑ Magnitude range:	min 3.00	max -3.00	in band of observation (this range is applied to the target magnitude)			
☐ Diameter:	min 0.00	max 12.00	mas			
☐ Spectral Type:	○ min O5.0	max M9.5	◉ K & M			
☐ Luminosity Class:	min I	max V				
☐ Quality Flag:	min 1	max 3				
☐ Ave.Norm.Vis.:	min 0.00	max 1.00				

Sort Results

Angular Dist

Submit Reset

VLTI Calibrator Selector

Expert

Instrument

Midi: N-Band	Disperser: PRISM Beam Combiner: HIGH_SENS
Amber: K-Band	Disperser: LOW Fringe Tracking: NONE

Target Definition

Target Coordinates:

Right Ascension:	6 45 08.9 hr min sec	Declination:	-16 42 58 deg min sec
Right Ascension:	deg (decimal)	Declination:	deg (decimal)
Target Name:	Target coords found using Simbad Web App		

Magnitude:

Band of Observation:	3.0
H band:	* AMBER + FINITO only
V band:	* AMBER + FINITO only

Observation Setup

LST:

Start: Hour: 00 Min: 00

End: Hour: 00 Min: 00

Time:

Observation Date: Year: 2008 Month: 1 Day: 1

Observation Start (UT): Hour: 00 Min: 00 Sec: 00

Timespan: Hour: - Min: 00 Sec: 00

Observatory Location:

Paranal: Latitude: -24.62794830 Longitude: -70.40479659

Configuration: U1 U3

* combination of UT and AT telescopes not allowed

Arbitrary Location: Latitude: 0.0 Longitude: 0.0

Baseline Length: 100.0 metres Baseline Angle: 0.0 degrees

VLTI Station Positions

Click on the image icon for a detailed VLTI map.

Altitude:

Min. Target Altitude: 15 degrees

Max. Sun Altitude: 0 degrees

Special:

Time between UV points: 15 mins

User Search Criteria

☑ Angular Dist:	min 0.00	max 25.00	deg		
☑ Magnitude range:	min 3.00	max -3.00	in band of observation	(this range is applied to the target magnitude)	
☐ Diameter:	min 0.00	max 12.00	mas		
☐ Spectral Type:	min O5.0	max M9.5	K & M		
☐ Luminosity Class:	min I	max V			
☐ Quality Flag:	min 1	max 3			
☐ Ave.Norm.Vis.:	min 0.00	max 1.00			

Sort Results

Angular Dist

Submit Reset

4.3.3 Target, RA, DEC, LST science, Magnitude at the wavelength of observation, H-magnitude, V-magnitude.

The target is introduced to the tool by two different possibilities.
The user can input the second equatorial coordinates of the target, the right ascension (RA) and the declination (DEC), in the native format as hour/minutes/seconds for RA and degrees/minutes/seconds for DEC or in the decimal format.
The other way is to input a name of the target, which could be resolved by Simbad. In this case, the coordinates of the target are queried from the Simbad data base using a Web Applet.

In the CfP mode the LST field should be filled, in the Expert mode the following set, the Observational Date, Observational Start and Timespan fields. The Observational Date is a UT Date on which the observation shall take place, the Observation Start is a time at which the observation shall take place, measured in Universal Time (UT). The Observation Timespan is the length of time the observation shall take.

Also, the magnitude at the wavelength of observation should be provided. While searching for the AMBER calibrators, additionally the H- and V-magnitudes are to be entered.

CalVin already supports these features.

4.3.4 Baseline/Instrument Setup

There are two supported instruments at the moment, MIDI and AMBER.
In both cases the user has to select a correct band pass (N; J, H, K), a disperser type (PRISM, GRISM; LOW, MEDIUM, HIGH), a beam combiner (HIGH_SENS, SCI_PHOT) or a fringe tracker (FINITO).

The baseline setup depends on the tool mode. In the CfP mode only the offered configurations are available.

CalVin already supports these features.

4.3.5 ESO Instrument Specific Search Criteria

This feature concerns the application of the instrument specific parameters to existing filtering capabilities.

For the time being the criterion is the magnitude constraint at the observation wavelength. A magnitude range chosen by the user for the calibrators will be checked for the consistency with the instrument magnitude constraint, offered for the current observational period.
For AMBER + FINITO configuration there would also be H and V magnitude constraints.

The constraints will be updated each period, for the simplicity of usage they will be stored in the special look-up table.

The application of ESO Instrument Specific Search Criteria to the User Search Criteria is obligatory in the CfP mode, and optional in the Expert mode.

CalVin does not currently support this feature.

4.3.6 User Search Criteria

In order to select the best suited calibrators, the user has an opportunity to apply the following filters, the angular distance to the source, the magnitude of the calibrator at the wavelength of observations, the angular diameter, the spectral type, the luminosity class, the average normalized visibility and the calibrator quality flag value.

CalVin already supports this feature.

4.3.7 List Selection

The scope of the target, instrument and filter parameters is sent to the ESO Web Server. All the necessary calculations are performed there, and the short list of calibrators selected out of the calibrator catalog is uploaded back to the CalVin Web page.

CalVin already supports this feature.

4.3.8 Pre-calculate Visibilities, Delay Line Range, Shadowing (VisCalc)

4.3.8.1 Pre-calculated visibilities

CalVin calculates a weighted average curve to compute the final visibility value, which depends on the filter transmission and the calibrator flux. The calculations are already implemented and made according to the following formula:

```
Units:
aU aV [metres]
lambda [metres]
singleDiscDiam [radians]

double uCoord = aU/lambda;
double vCoord = aV/lambda;
double rho = sqrt(uCoord*uCoord + vCoord*vCoord);

double uda = pi*singleDiscDiam*fabs(rho);
double vis = 2* fabs(besselJ(uda))/uda;
```

4.3.8.2 Delay Line Range

Delay lines have a finite length and this is a limiting factor for the execution of the full observation. Any delay line value greater than +100 or less than -100 makes the calculation results invalid.

CalVin already supports this feature.

4.3.8.3 Shadowing

The shadowing computation algorithm is already implemented to VisCalc.

CalVin will use the VisCalc algorithm to calculate the shadowing. The shadowing occurs when a target passes behind a telescope building. While the target is half behind a building

then the shadowing is 0.5 or 50%. The algorithm sets the default shadowing threshold to 0.1 or 10%. If the shadowing is greater than this the results are not recorded.

The visible LST range of the calibrator will be computed based on the entries above.

The CalVin does not currently support this feature.

4.3.9 ESO Operational Filter

The Operational Filter consists of the following entries: the distance to the target, the calibrator magnitude at the wavelength of observations, and the LST of the calibrator.
The ESO Operational Filter will apply to the short list of the calibrators generated from the JMMC provided calibrator catalogue. The application of the Operational Filter provides the user with the list of calibrators, which should be sent to the SearchCal-like part of the Calibrator tool.

The CalVin does not currently support this feature.

4.3.10 Calvin Output Format

The following statements are only relevant if the final software design is based on SearchCal.

This description is crucial, as it represents the interface between Calvin and SearchCal.

We propose to encode the HTML data into the XML format, the additional plots should be uploaded to the SearchCal-like tool as an attachment, for example .tar file.

Please note that if any information is to be added or removed (e.g if the provided calibrator list only contains a subset of the whole column sets, some filters may be disabled), the impact on handling it through SearchCal should be evaluated first.

4.4 SearchCal-like Tool

The following statements are only relevant if the final software design is based on SearchCal.

Concerning this tool, here are the answers given by ESO, to more deeply understand the requirements.

4.4.1 User Final Filter

The idea of the User Final Filter is to help the user to select one or two calibrators to generate the PAF files.
The set of interactive filters should represent all the columns in the final table given to the user.
No additional computations at the SearchCal-like tool side are needed for that.
The filter behaves like the current SearchCal tool on the table of displayed parameters.

4.4.2 Scheduling LST

The goal of the implementation of LST scheduling in the SearchCal-like tool is to provide the user with a friendly looking scheduling capability.

The target and calibrator observables are computed within the CalVin part of the tool as a function of LST, and the results of these computations are uploaded to the SeachCal-like tool in the XML format.

The tool is supposed to present the LST range as a special bar located next to the target and each of the calibrators.

4.4.3 PAF Files Generation

The PAF file is an ASCII file containing the following information: the coordinates of the calibrator, RA and DEC, the proper motions, the LST range etc. No further computations are needed to fill in the file, all necessary data will be passed from the CalVin part of the tool.

5 CONCLUSION

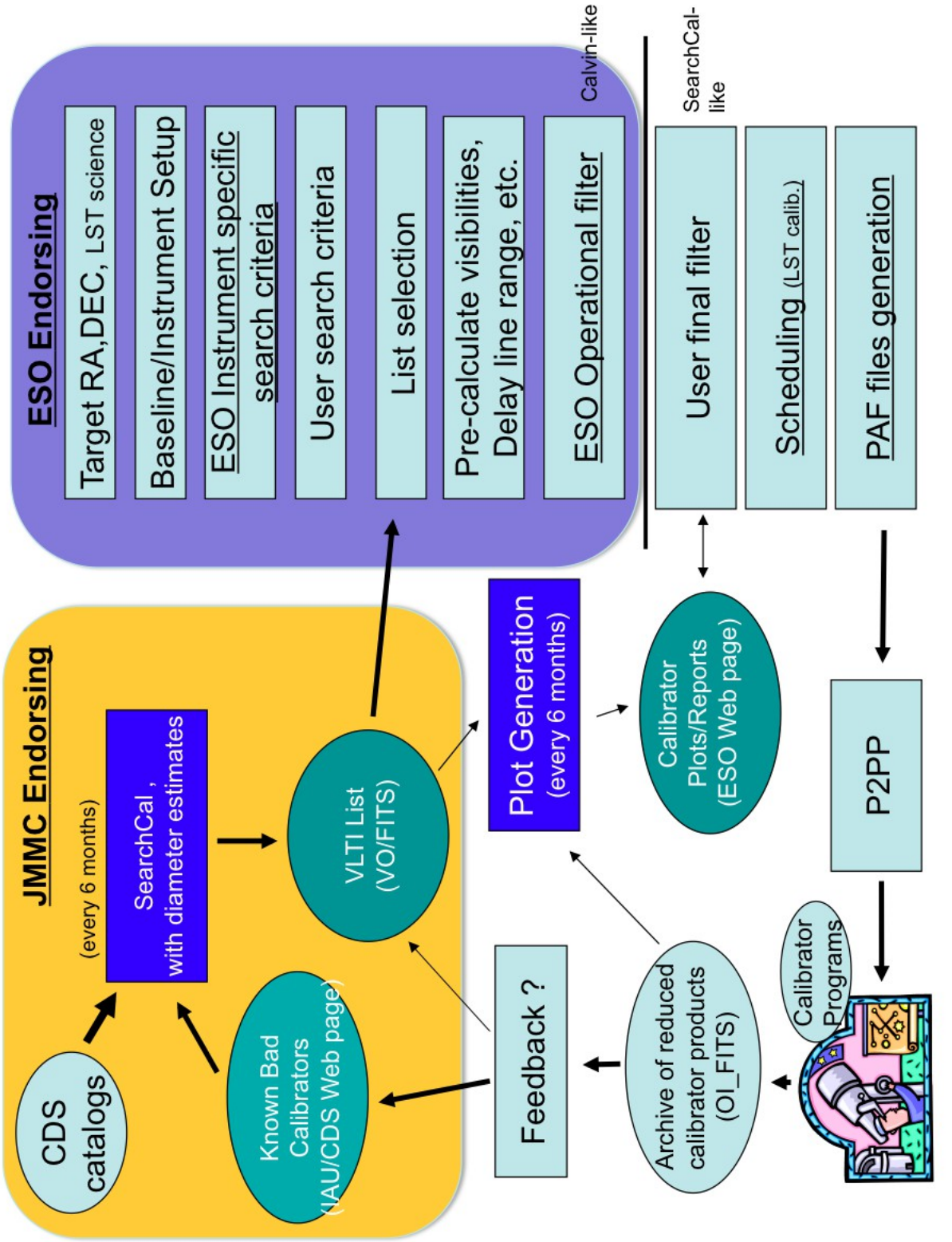
An updated workflow diagram with highlighted JMMC endorsement bricks surrendered in light orange (see 5) and highlighted ESO endorsement bricks surrendered in light violet is provided to further clarify our commitments for the coming period.

The other parts not yet endorsed will be further discussed in a forthcoming document (or revisions of the current document).

To summarize, the deliverables consist in:

- Newly generated calibrator catalogs for each observation period (starting December 2008, every 6 months);
- A tool to handle bad calibrators (End of 2009).

Appendix A. Workflow Diagram



Appendix B. CalVin Format Example

Name	$ID	Class	Description	UCD in SC's VOTable	Format
Name	$1	String	Calibrator name	Note 1	A30
hourRA	$2	Integer	Right Ascention - degrees	Note 2	I11
minuteRA	$3	Integer	Right Ascention - minutes	Note 2	I11
secondRA	$4	Float	Right Ascention - seconds	Note 2	E12.6
signDEC	$5	Integer	Declination - sign	Note 2	I11
degreeDEC	$6	Integer	Declination - degrees	Note 2	I11
minuteDEC	$7	Integer	Declination - minutes	Note 2	I11
secondDEC	$8	Float	Declination - seconds	Note 2	E12.6
epoch	$9	Integer	Epoch of coordinates	2000.0 (see Note 3)	I11
V_band	$10	Double	Magnitude in V band	V	E20.8
R_band	$11	Double	Magnitude in R band	R	E20.8
J_band	$12	Double	Magnitude in J band	J	E20.8
H_band	$13	Double	Magnitude in H band	H	E20.8
K_band	$14	Double	Magnitude in K band	K	E20.8
L_band	$15	Double	Magnitude in L band	L	E20.8
M_band	$16	Double	Magnitude in M band	M	E20.8
N_band	$17	Double	Magnitude in N band	N	E20.8
Q_band	$18	Double	Magnitude in Q band	99.0	E20.8
Sp	$19	String	Spectral class	SpType (note 4)	A30
L	$20	String	Luminosity class	SpType (note 4)	A30
flag	$21	Integer	Quality flag (current values 1, 2, 3)	Note 5	I11
diameter	$22	Float	Angular diameter in band	diam_vk (note 6)	E12.6
diameterErr	$23	Float	Diameter error	e_diam_vk (note 6)	E12.6
Model	$24	String	Model type: UD, UDJ, UDH, UDK, LDN, non	Note 6	A30
Teff	$25	Double	Effective temperature	Teff (note 7)	E20.8
logg	$26	Double	Surface gravity	Note 7	E20.8
Mass	$27	Double	Mass	Null	E20.8
vsini	$28	Double	Rotational velocity	RotVel	E20.8
vrad	$29	Double	Radial velocity	RadVel	E20.8
pi	$30	Double	Parallax	Plx	E20.8
epi	$31	Double	Parallax error	E_plx	E20.8
pmRA	$32	Double	Proper motion in Right Ascention	pmRA	E20.8
pmDEC	$33	Double	Proper motion in Declination	pmDE	E20.8
z	$34	Double	Redshift	Null	E20.8
Instrument	$35	String	Instrument: MIDI, AMBER_J, AMBER_H, AMBER_K	TBD ESO	A30
Reference	$36	String	Calibrator diameter reference	JSDC	A30

Notes:

1. First name found in UCDs “HD”,”HIP”,”DM”,”2MASS”. If all nulls, then other existing name will be used by ESO
2. Extract relevant field of RAJ2000 or DEJ2000 sexagesimal values
3. an Epoch is normally an Real, not an Integer
4. Extract Spectral Class SC and Luminosity class LC from composite “SpType” of the form [SC][LC]
5. Value 1 for stars that are listed in JSDC, and in either of the Borde, Merand, or MIDI consortium calibrator catalogues (but diameters are all given based on the JSDC method); value 2 for stars that are only listed in JSDC, and not known in the Borde, Merand, or MIDI consortium catalogues; value 3 for Stars that were added from the MIDI consortium catalogue, but are not listed in JSDC.
6. algorithm : LD diameter taken from the JMMC catalog, column ‘diam_vk’. This LD diameter is converted to UDD in the adequate band based on JMMC-MEM-2610-0001. Error is e_diam_vk since the error on LD and UD is almost identical for our purposes.
7. Teff and logg are computed according to JMMC-MEM-2610-0001

Appendix C. SearchCal VOTable Example

To achieve readability the SearchCal VOTable format is appended in a table form, containing a list of the columns extracted from the first version of JMMC provided calibrator catalogue (FITS format).

For each column the table includes also all the parameters and description available in the FITS file.

This Example is prepared using the TopCat tool.

Name	$ID	Class	Units	Description	UCD	UCD Description	Datatype	Decoder	Link	Null Value	VOTable ID
DuplicatedLines	$1	Integer		Number of duplicate rows			int			-2E+09	
HD	$2	String		HD identifier, click to call Simba on this object	ID_HD		char		http://simbad.u-strasbg.fr/simbad/sim-id?protocol=html&Ident=HD${HD}&NbIdent=1&Radius=1&Radius.unit=arcsec		col0
HD.origin	$3	String		Origin of property HD	ID_HD.origin		char				col1
HD.confidence	$4	Character		Confidence index of property HD	ID_HD.confidence		char				col2
HIP	$5	String			ID_HIP		char				col3
HIP.origin	$6	String		Origin of property HIP	ID_HIP.origin		char				col4
HIP.confidence	$7	Character		Confidence index of property HIP	ID_HIP.confidence		char				col5
DM	$8	String			ID_DM		char				col6
DM.origin	$9	String		Origin of property DM	ID_DM.origin		char				col7
DM.confidence	$10	Character		Confidence index of property DM	ID_DM.confidence		char				col8
TYC1	$11	String			ID_TYC1		char				col9
TYC1.origin	$12	String		Origin of property TYC1	ID_TYC1.origin		char				col10
TYC1.confidence	$13	Character		Confidence index of property TYC1	ID_TYC1.confidence		char				col11
TYC2	$14	String			ID_TYC2		char				col12
TYC2.origin	$15	String		Origin of property TYC2	ID_TYC2.origin		char				col13
TYC2.confidence	$16	Character		Confidence index of property TYC2	ID_TYC2.confidence		char				col14
TYC3	$17	Character			ID_TYC3		char				col15
TYC3.origin	$18	String		Origin of property TYC3	ID_TYC3.origin		char				col16
TYC3.confidence	$19	Character		Confidence index of property TYC3	ID_TYC3.confidence		char				col17
opt	$20	Character			ID_CATALOG	Catalog Identification	char				col18
opt.origin	$21	String		Origin of property opt	ID_CATALOG.origin		char				col19
opt.confidence	$22	Character		Confidence index of property opt	ID_CATALOG.confidence		char				col20

Name	$ID	Class	Units	Description	UCD	UCD Description	Datatype	Decoder	Link	Null Value	VOTable ID
2MASS	$23	String		2MASS identifier, click to call Vi on this object	ID_2MASS		char		http://cdsweb.u-strasbg.fr/viz-bin/VizieR-4 source=II/246/out&-out=2MASS&2MASS=$.2M SS)&-out=Hmag&-out=e_Hmag&-out=Kmag out=e_Kmag&-out=Qflg&-out=Rflg&-out=Bflg&-out=Cflg&-out=Xflg&-out=Aflg-meta.ucd=0		col21
2MASS.origin	$24	String		Origin of property 2MASS	ID_2MASS.origin		char				col22
2MASS.confidence	$25	Character		Confidence index of property	ID_2MASS.confidenc		char				col23
RAJ2000	$26	String	h:m:s	Click to call Simbad based on th coordinates	POS_EQ_RA_MAIN	Right Ascension	char	HMS->degrees	http://simbad.u-strasbg.fr/simbad/sim-id?protocol=html&Ident RAJ2000)%20$(DEJ2000) NbIdent=1&Radius=1&Ra us.unit=arcsec		col24
RAJ2000.origin	$27	String		Origin of property RAJ2000	POS_EQ_RA_MAIN.o in		char	HMS->degrees			col25
RAJ2000.confidenc	$28	Character		Confidence index of property RAJ2000	POS_EQ_RA_MAIN.c fidence		char				col26
DEJ2000	$29	String	d:m:s	Click to call Simbad based on th coordinates	POS_EQ_DEC_MAIN	Declination	char	DMS->degrees	http://simbad.u-strasbg.fr/simbad/sim-id?protocol=html&Ident RAJ2000)%20$(DEJ2000) NbIdent=1&Radius=1&Ra us.unit=arcsec		col27
DEJ2000.origin	$30	String		Origin of property DEJ2000	POS_EQ_DEC_MAIN. gin		char	DMS->degrees			col28
DEJ2000.confidenc	$31	Character		Confidence index of property DEJ2000	POS_EQ_DEC_MAIN. nfidence		char				col29

Name	$ID	Class	Units	Description	UCD	UCD Description	Datatype	Decode	Link	Null Value	VOTable ID
DENIS	$32	Character			ID_DENIS		char				col30
DENIS.origin	$33	Character		Origin of property DENIS	ID_DENIS.origin		char				col31
DENIS.confidence	$34	Character		Confidence index of property DENIS	ID_DENIS.confidence		char				col32
A2RAdeg	$35	Character	h:m:s		POS_EQ_RA_OTHER	Right Ascension in Non-Standard Units or partial valu	char				col33
A2RAdeg.origin	$36	Character		Origin of property A2RAdeg	POS_EQ_RA_OTHER.origin		char				col34
A2RAdeg.confidence	$37	Character		Confidence index of property A2RA	POS_EQ_RA_OTHER.confiden		char				col35
A2DEdeg	$38	Character	d:m:s		POS_EQ_DEC_OTHER	Declination in Non-Standard Units or partial values	char				col36
A2DEdeg.origin	$39	Character		Origin of property A2DEdeg	POS_EQ_DEC_OTHER.origin		char				col37
A2DEdeg.confidence	$40	Character		Confidence index of property A2DE	POS_EQ_DEC_OTHER.confide		char				col38
pmDec	$41	String	mas/yr		POS_EQ_PMDEC	Proper Motion in Declination (pmdec)	char				col39
pmDec.origin	$42	String		Origin of property pmDec	POS_EQ_PMDEC.origin		char				col40
pmDec.confidence	$43	Character		Confidence index of property pmDe	POS_EQ_PMDEC.confidence		char				col41
pmRa	$44	String	mas/yr		POS_EQ_PMRA	Proper Motion in Right Ascension (pmra)	char				col42
pmRa.origin	$45	String		Origin of property pmRa	POS_EQ_PMRA.origin		char				col43
pmRa.confidence	$46	Character		Confidence index of property pmRa	POS_EQ_PMRA.confidence		char				col44
plx	$47	Float	mas		POS_PARLX_TRIG	Trigonometric Parallax	float				col45
plx.origin	$48	String		Origin of property plx	POS_PARLX_TRIG.origin		char				col46
plx.confidence	$49	Character		Confidence index of property plx	POS_PARLX_TRIG.confidence		char				col47
SpType	$50	String			SPECT_TYPE_MK	MK Spectral Classification	char				col48
SpType.origin	$51	String		Origin of property SpType	SPECT_TYPE_MK.origin		char				col49
SpType.confidence	$52	Character		Confidence index of property SpTyp	SPECT_TYPE_MK.confidence		char				col50
VarFlag1	$53	Character			CODE_VARIAB_V1		char				col51
VarFlag1.origin	$54	String		Origin of property VarFlag1	CODE_VARIAB_V1.origin		char				col52
VarFlag1.confidence	$55	Character		Confidence index of property VarFl	CODE_VARIAB_V1.confidence		char				col53

Name	$ID	Class	Units	Description	UCD	UCD Description	Datatype	Decode	Link	Null Value	VOTable ID
RadVel	$83	String			VELOC_HC	Heliocentric Radial Veloci	char				col81
RadVel.origin	$84	String		Origin of property RadVel	VELOC_HC.origin		char				col82
RadVel.confidence	$85	Character		Confidence index of property RadV	VELOC_HC.confidence		char				col83
LD	$86	Float			LD_DIAM		float				col84
LD.origin	$87	String		Origin of property LD	LD_DIAM.origin		char				col85
LD.confidence	$88	Character		Confidence index of property LD	LD_DIAM.confidence		char				col86
e_LD	$89	Float			LD_DIAM_ERROR		float				col87
e_LD.origin	$90	String		Origin of property e_LD	LD_DIAM_ERROR.origin		char				col88
e_LD.confidence	$91	Character		Confidence index of property e_LD	LD_DIAM_ERROR.confidence		char				col89
UD	$92	Float			UD_DIAM		float				col90
UD.origin	$93	String		Origin of property UD	UD_DIAM.origin		char				col91
UD.confidence	$94	Character		Confidence index of property UD	UD_DIAM.confidence		char				col92
e_UD	$95	Float			UD_DIAM_ERROR		float				col93
e_UD.origin	$96	String		Origin of property e_UD	UD_DIAM_ERROR.origin		char				col94
e_UD.confidence	$97	Character		Confidence index of property e_UD	UD_DIAM_ERROR.confidence		char				col95
UDDK	$98	Float			UDDK_DIAM		float				col96
UDDK.origin	$99	String		Origin of property UDDK	UDDK_DIAM.origin		char				col97
UDDK.confidence	$100	Character		Confidence index of property UDDK	UDDK_DIAM.confidence		char				col98
e_UDDK	$101	Float			UDDK_DIAM_ERROR		float				col99
e_UDDK.origin	$102	String		Origin of property e_UDDK	UDDK_DIAM_ERROR.origin		char				col100
e_UDDK.confidence	$103	Character		Confidence index of property e_UD	UDDK_DIAM_ERROR.confider		char				col101
Dia12	$104	Float			DIAM12		float				col102
Dia12.origin	$105	Character		Origin of property Dia12	DIAM12.origin		char				col103
Dia12.confidence	$106	Character		Confidence index of property Dia12	DIAM12.confidence		char				col104
e_dia12	$107	Float			DIAM12_ERROR		float				col105
e_dia12.origin	$108	Character		Origin of property e_dia12	DIAM12_ERROR.origin		char				col106
e_dia12.confidence	$109	Character		Confidence index of property e_dia	DIAM12_ERROR.confidence		char				col107

Name	$ID	Class	Units	Description	UCD	UCD Description	Datatype	Decode	Link	Null Value	VOTable ID
Meth	$110	String			REDUCT_METHOD	Reduction Method	char				col108
Meth.origin	$111	String		Origin of property Meth	REDUCT_METHOD.origin		char				col109
Meth.confidence	$112	Character		Confidence index of property Meth	REDUCT_METHOD.confidence		char				col110
lambda_old	$113	Float			INST_WAVELENGTH_VALUE	Wavelength related to an instrument, filter, etc.	float				col111
lambda.origin_old	$114	Character		Origin of property lambda	INST_WAVELENGTH_VALUE.orig		char				col112
lambda.confidence_old	$115	Character		Confidence index of property lamb	INST_WAVELENGTH_VALUE.con fence		char				col113
lambda_olda	$116	String			INST_FILTER_CODE	Filter characteristics type/code	char				col114
lambda.origin_olda	$117	String		Origin of property lambda	INST_FILTER_CODE.origin		char				col115
lambda.confidence_old	$118	Character		Confidence index of property lamb	INST_FILTER_CODE.confidence		char				col116
photflux	$119	Character			PHOT_FLUX_IR_MISC	Miscellaneous IR fluxes	char				col117
photflux.origin	$120	Character		Origin of property photflux	PHOT_FLUX_IR_MISC.origin		char				col118
photflux.confidence	$121	Character		Confidence index of property phot	PHOT_FLUX_IR_MISC.confiden		char				col119
units	$122	Character			UNITS	Units in which a quantity i measured	char				col120
units.origin	$123	String		Origin of property units	UNITS.origin		char				col121
units.confidence	$124	Character		Confidence index of property units	UNITS.confidence		char				col122
B	$125	Float	mag		PHOT_JHN_B	Johnson magnitude B (JHN centered at 450nm	float				col123
B.origin	$126	String		Origin of property B	PHOT_JHN_B.origin		char				col124
B.confidence	$127	Character		Confidence index of property B	PHOT_JHN_B.confidence		char				col125
Bphg	$128	Float	mag		PHOT_PHG_B	Photographic blue magnitude B (includes the magnitude of POSS)	float				col126
Bphg.origin	$129	String		Origin of property Bphg	PHOT_PHG_B.origin		char				col127
Bphg.confidence	$130	Character		Confidence index of property Bphg	PHOT_PHG_B.confidence		char				col128

Name	$ID	Class	Units	Description	UCD	UCD Description	Datatype	Decode	Link	Null Value	VOTable ID
V	$131	Float	mag		PHOT_JHN_V	Johnson-Cousins magnitude V (JH	float				col129
V.origin	$132	String		Origin of property V	PHOT_JHN_V.origin		char				col130
V.confidence	$133	Characte		Confidence index of property V	PHOT_JHN_V.confidence		char				col131
Vphg	$134	Float	mag		PHOT_PHG_V	Photographic visual magnitude V	float				col132
Vphg.origin	$135	Characte		Origin of property Vphg	PHOT_PHG_V.origin		char				col133
Vphg.confidence	$136	Characte		Confidence index of property Vphg	PHOT_PHG_V.confidence		char				col134
R	$137	Float	mag		PHOT_JHN_R	Johnson magnitude R (JHN)	float				col135
R.origin	$138	String		Origin of property R	PHOT_JHN_R.origin		char				col136
R.confidence	$139	String		Confidence index of property R	PHOT_JHN_R.confidence		char				col137
Rphg	$140	Float	mag		PHOT_PHG_R	Photographic red band magnitud (includes E magnitude from POSS	float				col138
Rphg.origin	$141	String		Origin of property Rphg	PHOT_PHG_R.origin		char				col139
Rphg.confidence	$142	Characte		Confidence index of property Rphg	PHOT_PHG_R.confidence		char				col140
I	$143	Float	mag		PHOT_JHN_I	Johnson magnitude I (JHN), centered at 0.87 μm	float				col141
I.origin	$144	String		Origin of property I	PHOT_JHN_I.origin		char				col142
I.confidence	$145	String		Confidence index of property I	PHOT_JHN_I.confidence		char				col143
Iphg	$146	Float	mag		PHOT_PHG_I	Photographic magnitude I	float				col144
Iphg.origin	$147	Characte		Origin of property Iphg	PHOT_PHG_I.origin		char				col145
Iphg.confidence	$148	Characte		Confidence index of property Iphg	PHOT_PHG_I.confidence		char				col146
Icous	$149	Float	mag		PHOT_COUS_I	Cousins magnitude I COUS	float				col147
Icous.origin	$150	Characte		Origin of property Icous	PHOT_COUS_I.origin		char				col148
Icous.confidence	$151	Characte		Confidence index of property Icou	PHOT_COUS_I.confidence		char				col149
J	$152	Float	mag		PHOT_JHN_J	Johnson magnitude J (JHN), also used in DENIS (1.25 μm)	float				col150
J.origin	$153	String		Origin of property J	PHOT_JHN_J.origin		char				col151
J.confidence	$154	String		Confidence index of property J	PHOT_JHN_J.confidence		char				col152

Name	$ID	Class	Units	Description	UCD	UCD Description	Datatype	Decode	Link	Null Value	VOTable ID
H	$155	Float	mag		PHOT_JHN_H	Johnson magnitude H (JHN),	float				col153
H.origin	$156	String		Origin of property H	PHOT_JHN_H.origin		char				col154
H.confidence	$157	String		Confidence index of property H	PHOT_JHN_H.confidence		char				col155
K	$158	Float	mag		PHOT_JHN_K	Johnson magnitude K (JHN), and filter in DENIS (2.15+/-0.1mu;m)	float				col156
K.origin	$159	String		Origin of property K	PHOT_JHN_K.origin		char				col157
K.confidence	$160	String		Confidence index of property K	PHOT_JHN_K.confidence		char				col158
L	$161	Float	mag		PHOT_JHN_L	Johnson magnitude L (JHN)	float				col159
L.origin	$162	String		Origin of property L	PHOT_JHN_L.origin		char				col160
L.confidence	$163	String		Confidence index of property L	PHOT_JHN_L.confidence		char				col161
M	$164	Float	mag		PHOT_JHN_M	Johnson magnitude M (JHN) (5.0+/-0.1mu;m)	float				col162
M.origin	$165	String		Origin of property M	PHOT_JHN_M.origin		char				col163
M.confidence	$166	String		Confidence index of property M	PHOT_JHN_M.confidence		char				col164
N	$167	Float	mag		PHOT_JHN_N	Johnson flux magnitude N (JHN) (9.0+/-0.1mu;m)	float				col165
N.origin	$168	Character		Origin of property N	PHOT_JHN_N.origin		char				col166
N.confidence	$169	Character		Confidence index of property N	PHOT_JHN_N.confidence		char				col167
RotVel	$170	String			VELOC_ROTAT	Rotational Velocity	char				col168
RotVel.origin	$171	String		Origin of property RotVel	VELOC_ROTAT.origin		char				col169
RotVel.confidence	$172	Character		Confidence index of property RotV	VELOC_ROTAT.confidence		char				col170
color	$173	Character			PHOT_COLOR_EXCESS	Color excess (not just E(B-V))	char				col171
color.origin	$174	Character		Origin of property color	PHOT_COLOR_EXCESS.origin		char				col172
color.confidence	$175	Character		Confidence index of property color	PHOT_COLOR_EXCESS.confider		char				col173
orig	$176	Character			IR_FLUX_ORIGIN		char				col174
orig.origin	$177	Character		Origin of property orig	IR_FLUX_ORIGIN.origin		char				col175
orig.confidence	$178	Character		Confidence index of property orig	IR_FLUX_ORIGIN.confidence		char				col176

Name	$ID	Class	Units	Description	UCD	UCD Description	Datatype	Decode	Link	Null Value	VOTable ID
e_Plx	$179	Float			POS_PARLX_TRIG_ERROR		float				col177
e_Plx.origin	$180	String		Origin of property e_Plx	POS_PARLX_TRIG_ERROR.origin		char				col178
e_Plx.confidence	$181	Characte		Confidence index of property e_	POS_PARLX_TRIG_ERROR.confiden		char				col179
F12	$182	Float			PHOT_FLUX_IR_12	Flux density (IRAS) at 12 micro or around 12 microns (ISO at 1	float				col180
F12.origin	$183	Characte		Origin of property F12	PHOT_FLUX_IR_12.origin		char				col181
F12.confidence	$184	Characte		Confidence index of property F1	PHOT_FLUX_IR_12.confidence		char				col182
e_F12	$185	Float			PHOT_FLUX_IR_12_ERROR		float				col183
e_F12.origin	$186	Characte		Origin of property e_F12	PHOT_FLUX_IR_12_ERROR.origin		char				col184
e_F12.confidence	$187	Characte		Confidence index of property e_	PHOT_FLUX_IR_12_ERROR.confide		char				col185
Calib	$188	Characte			REF_STAR		char				col186
Calib.origin	$189	Characte		Origin of property Calib	REF_STAR.origin		char				col187
Calib.confidence	$190	Characte		Confidence index of property Cal	REF_STAR.confidence		char				col188
Teff	$191	Float			PHYS_TEMP_EFFEC	Effective Temperature	float				col189
Teff.origin	$192	Characte		Origin of property Teff	PHYS_TEMP_EFFEC.origin		char				col190
Teff.confidence	$193	Characte		Confidence index of property Tef	PHYS_TEMP_EFFEC.confidence		char				col191
e_Teff	$194	Float			PHYS_TEMP_EFFEC_ERROR		float				col192
e_Teff.origin	$195	Characte		Origin of property e_Teff	PHYS_TEMP_EFFEC_ERROR.origin		char				col193
e_Teff.confidence	$196	Characte		Confidence index of property e_	PHYS_TEMP_EFFEC_ERROR.confide		char				col194
A_V	$197	Float			PHOT_EXTINCTION_TOTAL	Total Extinction	float				col195
A_V.origin	$198	Characte		Origin of property A_V	PHOT_EXTINCTION_TOTAL.origin		char				col196
A_V.confidence	$199	Characte		Confidence index of property A_	PHOT_EXTINCTION_TOTAL.confider		char				col197
Chi2	$200	Float			CHI2_QUALITY		float				col198
Chi2.origin	$201	Characte		Origin of property Chi2	CHI2_QUALITY.origin		char				col199
Chi2.confidence	$202	Characte		Confidence index of property Chi	CHI2_QUALITY.confidence		char				col200
SpTyp_Teff	$203	Float			SP_TYP_PHYS_TEMP_EFFEC		float				col201
SpTyp_Teff.origin	$204	Characte		Origin of property SpTyp_Teff	SP_TYP_PHYS_TEMP_EFFEC.origin		char				col202
SpTyp_Teff.confiden	$205	Characte		Confidence index of property	SP_TYP_PHYS_TEMP_EFFEC.confide		char				col203

Name	$ID	Class	Units	Description	UCD	UCD Description	Datatype	Decode	Link	Null Value	VOTable ID
Jcous	$206	Float	mag		PHOT_COUS_J		float				col204
Jcous.origin	$207	Character		Origin of property Jcous	PHOT_COUS_J.origin		char				col205
Jcous.confidence	$208	Character		Confidence index of property Jcous	PHOT_COUS_J.confidence		char				col206
Hcous	$209	Float	mag		PHOT_COUS_H		float				col207
Hcous.origin	$210	Character		Origin of property Hcous	PHOT_COUS_H.origin		char				col208
Hcous.confidence	$211	Character		Confidence index of property Hcous	PHOT_COUS_H.confidence		char				col209
Kcous	$212	Float	mag		PHOT_COUS_K		float				col210
Kcous.origin	$213	Character		Origin of property Kcous	PHOT_COUS_K.origin		char				col211
Kcous.confidence	$214	Character		Confidence index of property Kcous	PHOT_COUS_K.confidence		char				col212
diam_bv	$215	Float		diameter b-v	DIAM_BV		float				col213
diam_bv.origin	$216	String		Origin of property diam_bv	DIAM_BV.origin		char				col214
diam_bv.confidence	$217	String		Confidence index of property diam_bv	DIAM_BV.confidence		char				col215
diam_vr	$218	Float			DIAM_VR		float				col216
diam_vr.origin	$219	String		Origin of property diam_vr	DIAM_VR.origin		char				col217
diam_vr.confidence	$220	String		Confidence index of property diam_vr	DIAM_VR.confidence		char				col218
diam_vk	$221	Float			DIAM_VK		float				col219
diam_vk.origin	$222	String		Origin of property diam_vk	DIAM_VK.origin		char				col220
diam_vk.confidence	$223	String		Confidence index of property diam_vk	DIAM_VK.confidence		char				col221
diam_ij	$224	Float			DIAM_IJ		float				col222
diam_ij.origin	$225	Character		Origin of property diam_ij	DIAM_IJ.origin		char				col223
diam_ij.confidence	$226	Character		Confidence index of property diam_ij	DIAM_IJ.confidence		char				col224
diam_ik	$227	Float			DIAM_IK		float				col225
diam_ik.origin	$228	Character		Origin of property diam_ik	DIAM_IK.origin		char				col226
diam_ik.confidence	$229	Character		Confidence index of property diam_ik	DIAM_IK.confidence		char				col227
diam_jk	$230	Float			DIAM_JK		float				col228
diam_jk.origin	$231	Character		Origin of property diam_jk	DIAM_JK.origin		char				col229
diam_jk.confidence	$232	Character		Confidence index of property diam_jk	DIAM_JK.confidence		char				col230

Name	$ID	Class	Units	Description	UCD	UCD Description	Datatype	Decode	Link	Null Value	VOTable ID
diam_jh	$233	Float			DIAM_JH		float				col231
diam_jh.origin	$234	Character		Origin of property diam_jh	DIAM_JH.origin		char				col232
diam_jh.confidence	$235	Character		Confidence index of property diam_jh	DIAM_JH.confidence		char				col233
diam_hk	$236	Float			DIAM_HK		float				col234
diam_hk.origin	$237	Character		Origin of property diam_hk	DIAM_HK.origin		char				col235
diam_hk.confidence	$238	Character		Confidence index of property diam_hk	DIAM_HK.confidence		char				col236
diam_mean	$239	Float			DIAM_MEAN		float				col237
diam_mean.origin	$240	Character		Origin of property diam_mean	DIAM_MEAN.origin		char				col238
diam_mean.confidence	$241	Character		Confidence index of property diam_m	DIAM_MEAN.confidence		char				col239
e_diam_bv	$242	Float			DIAM_BV_ERROR		float				col240
e_diam_bv.origin	$243	String		Origin of property e_diam_bv	DIAM_BV_ERROR.origin		char				col241
e_diam_bv.confidence	$244	String		Confidence index of property e_diam_	DIAM_BV_ERROR.confidenc		char				col242
e_diam_vr	$245	Float			DIAM_VR_ERROR		float				col243
e_diam_vr.origin	$246	String		Origin of property e_diam_vr	DIAM_VR_ERROR.origin		char				col244
e_diam_vr.confidence	$247	String		Confidence index of property e_diam_	DIAM_VR_ERROR.confidenc		char				col245
e_diam_vk	$248	Float			DIAM_VK_ERROR		float				col246
e_diam_vk.origin	$249	String		Origin of property e_diam_vk	DIAM_VK_ERROR.origin		char				col247
e_diam_vk.confidence	$250	String		Confidence index of property e_diam_	DIAM_VK_ERROR.confidenc		char				col248
e_diam_ij	$251	Float			DIAM_IJ_ERROR		float				col249
e_diam_ij.origin	$252	Character		Origin of property e_diam_ij	DIAM_IJ_ERROR.origin		char				col250
e_diam_ij.confidence	$253	Character		Confidence index of property e_diam_	DIAM_IJ_ERROR.confidence		char				col251
e_diam_ik	$254	Float			DIAM_IK_ERROR		float				col252
e_diam_ik.origin	$255	Character		Origin of property e_diam_ik	DIAM_IK_ERROR.origin		char				col253
e_diam_ik.confidence	$256	Character		Confidence index of property e_diam_	DIAM_IK_ERROR.confidence		char				col254
e_diam_jk	$257	Float			DIAM_JK_ERROR		float				col255
e_diam_jk.origin	$258	Character		Origin of property e_diam_jk	DIAM_JK_ERROR.origin		char				col256
e_diam_jk.confidence	$259	Character		Confidence index of property e_diam_	DIAM_JK_ERROR.confidence		char				col257

Name	$ID	Class	Units	Description	UCD	UCD Description	Datatype	Decode	Link	Null Value	VOTable ID
e_diam_jh	$260	Float			DIAM_JH_ERROR		float				col258
e_diam_jh.origin	$261	Character		Origin of property e_diam_jh	DIAM_JH_ERROR.origin		char				col259
e_diam_jh.confidence	$262	Character		Confidence index of property e_diam_	DIAM_JH_ERROR.confidence		char				col260
e_diam_hk	$263	Float			DIAM_HK_ERROR		float				col261
e_diam_hk.origin	$264	Character		Origin of property e_diam_hk	DIAM_HK_ERROR.origin		char				col262
e_diam_hk.confidence	$265	Character		Confidence index of property e_diam_	DIAM_HK_ERROR.confidence		char				col263
e_diam_mean	$266	Float			DIAM_MEAN_ERROR		float				col264
e_diam_mean.origin	$267	Character		Origin of property e_diam_mean	DIAM_MEAN_ERROR.origin		char				col265
e_diam_mean.confidence	$268	Character		Confidence index of property	DIAM_MEAN_ERROR.confiden		char				col266
diamFlag	$269	String			DIAM_FLAG		char				col267
diamFlag.origin	$270	String		Origin of property diamFlag	DIAM_FLAG.origin		char				col268
diamFlag.confidence	$271	String		Confidence index of property diamFlag	DIAM_FLAG.confidence		char				col269
Av	$272	Float			EXTINCTION_RATIO		float				col270
Av.origin	$273	String		Origin of property Av	EXTINCTION_RATIO.origin		char				col271
Av.confidence	$274	String		Confidence index of property Av	EXTINCTION_RATIO.confidenc		char				col272
Mo	$275	Float	mag		MO		float				col273
Mo.origin	$276	String		Origin of property Mo	MO.origin		char				col274
Mo.confidence	$277	String		Confidence index of property Mo	MO.confidence		char				col275
Lo	$278	Float	mag		LO		float				col276
Lo.origin	$279	String		Origin of property Lo	LO.origin		char				col277
Lo.confidence	$280	String		Confidence index of property Lo	LO.confidence		char				col278
Ko	$281	Float	mag		KO		float				col279
Ko.origin	$282	String		Origin of property Ko	KO.origin		char				col280
Ko.confidence	$283	String		Confidence index of property Ko	KO.confidence		char				col281
Ho	$284	Float	mag		HO		float				col282
Ho.origin	$285	String		Origin of property Ho	HO.origin		char				col283
Ho.confidence	$286	String		Confidence index of property Ho	HO.confidence		char				col284

Name	$ID	Class	Units	Description	UCD	UCD Description	Datatype	Decode	Link	Null Value	VOTable ID
Jo	$287	Float	mag		JO		float				col285
Jo.origin	$288	String		Origin of property Jo	JO.origin		char				col286
Jo.confidence	$289	String		Confidence index of property Jo	JO.confidence		char				col287
Io	$290	Float	mag		IO		float				col288
Io.origin	$291	String		Origin of property Io	IO.origin		char				col289
Io.confidence	$292	String		Confidence index of property Io	IO.confidence		char				col290
Ro	$293	Float	mag		RO		float				col291
Ro.origin	$294	String		Origin of property Ro	RO.origin		char				col292
Ro.confidence	$295	String		Confidence index of property Ro	RO.confidence		char				col293
Vo	$296	Float	mag		VO		float				col294
Vo.origin	$297	String		Origin of property Vo	VO.origin		char				col295
Vo.confidence	$298	String		Confidence index of property Vo	VO.confidence		char				col296
Bo	$299	Float	mag		BO		float				col297
Bo.origin	$300	String		Origin of property Bo	BO.origin		char				col298
Bo.confidence	$301	String		Confidence index of property Bo	BO.confidence		char				col299
vis2	$302	Float			VIS2		float				col300
vis2.origin	$303	String		Origin of property vis2	VIS2.origin		char				col301
vis2.confidence	$304	String		Confidence index of property vis2	VIS2.confidence		char				col302
vis2Err	$305	Float			VIS2_ERROR		float				col303
vis2Err.origin	$306	String		Origin of property vis2Err	VIS2_ERROR.origin		char				col304
vis2Err.confidence	$307	String		Confidence index of property vis2Err	VIS2_ERROR.confidence		char				col305
vis2(8mu)	$308	Float			VIS2_8		float				col306
vis2(8mu).origin	$309	Characte		Origin of property vis2(8mu)	VIS2_8.origin		char				col307
vis2(8mu).confidence	$310	Characte		Confidence index of property vis2(8mu)	VIS2_8.confidence		char				col308
vis2Err(8mu)	$311	Float			VIS2_8_ERROR		float				col309
vis2Err(8mu).origin	$312	Characte		Origin of property vis2Err(8mu)	VIS2_8_ERROR.origin		char				col310
vis2Err(8mu).confidence	$313	Characte		Confidence index of property vis2Err(8mu	VIS2_8_ERROR.confidence		char				col311

Name	$ID	Class	Units	Description	UCD	UCD Description	Datatype	Decode	Link	Null Value	VOTable ID
vis2(13mu)	$314	Float			VIS2_13		float				col312
vis2(13mu).origin	$315	Character		Origin of property vis2(13mu)	VIS2_13.origin		char				col313
vis2(13mu).confidence	$316	Character		Confidence index of property vis2(13mu)	VIS2_13.confidence		char				col314
vis2Err(13mu)	$317	Float			VIS2_13_ERROR		float				col315
vis2Err(13mu).origin	$318	Character		Origin of property vis2Err(13mu)	VIS2_13_ERROR.origin		char				col316
vis2Err(13mu).confidence	$319	Character		Confidence index of property vis2Err(13m	VIS2_13_ERROR.confidence		char				col317
vis2Flag	$320	Character			VIS2_FLAG		char				col318
vis2Flag.origin	$321	Character		Origin of property vis2Flag	VIS2_FLAG.origin		char				col319
vis2Flag.confidence	$322	Character		Confidence index of property vis2Flag	VIS2_FLAG.confidence		char				col320
dist	$323	Short					short			-32768	
dist.origin	$324	String		Origin of property dist	DIST.origin		char				col322
dist.confidence	$325	String		Confidence index of property dist	DIST.confidence		char				col323
deletedFlag	$326	Boolean		Used by SearchCal to flag deleted stars	DELETED_FLAG		boolean				col324
deletedFlag.origin	$327	Character		Origin of property deletedFlag	DELETED_FLAG.origin		char				col325
deletedFlag.confidence	$328	Character		Confidence index of property deletedFla	DELETED_FLAG.confidence		char				col326
CoordHashCode	$329	String					char				
_HIP	$330	Double					double				
_DM	$331	Double					double				
_HD	$332	Double					double				
HIPGroupID	$333	Integer		ID for match group			int			-2.1E+09	
HIPGroupSize	$334	Integer		Number of rows in match group			int			-2.1E+09	
HDGroupID	$335	Integer		ID for match group			int			-2.1E+09	
HDGroupSize	$336	Integer		Number of rows in match group			int			-2.1E+09	
DMGroupID	$337	Integer		ID for match group			int			-2.1E+09	
DMGroupSize	$338	Integer		Number of rows in match group			int			-2.1E+09	